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ARMY THEATER MISSILE DEFENSE OPERATIONS

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Army Theater Missile Defense Operations

Contents

Page

PREFACE iv

Chapter 1 **INTRODUCTION**
General 1-1
Theater Missile Defense Threat Environment 1-3
Objectives of Joint Theater Missile Defense 1-4
Operational Environment 1-5
Theater Missile Defense Imperatives 1-6
Army Universal Tasks 1-8
Overview of the Manual 1-10

Chapter 2 **THREAT**
General 2-1
Historical Perspective 2-3
Theater Missile Threat to Army Operations 2-3
Theater Ballistic Missiles 2-4
Large-Caliber and Multiple Launch Rockets 2-7
Cruise Missiles 2-7
Air-to-Surface Missiles 2-9
Unmanned Aerial Vehicles 2-10
Global Threat Environment 2-11

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Transnational Threat 2-21
Summary 2-21

Chapter 3 THE ARMY IN JOINT THEATER MISSILE DEFENSE
General 3-1
Joint Theater Missile Defense Organization 3-1
Army Theater Missile Defense Organization 3-3
Army Theater Missile Defense Operations 3-6
Multinational Theater Missile Defense Operations 3-11

Chapter 4 COMMAND AND CONTROL
General 4-1
Command, Control, Communications, Computers, and Intelligence Organization ... 4-2
Force Projection Planning 4-4
Stages I and II—Mobilization and Predeployment 4-6
Stages III and IV—Deployment and Entry Operations 4-7
Stage V—Decisive Operations 4-13
Stages VI and VII—Redeployment and Post Conflict 4-14
Stage VIII—Demobilization 4-15

Chapter 5 ATTACK OPERATIONS
General 5-1
Decide, Detect, Deliver, and Assess Process 5-2
Attack Operations Organization 5-5
Force Projection Planning 5-7
Stages I and II—Mobilization and Predeployment 5-8
Stages III and IV—Deployment and Entry Operations 5-9
Stage V—Decisive Operations 5-14
Stages VI and VII—Redeployment and Post Conflict..... 5-15
Stage VIII—Demobilization 5-15

Chapter 6 ACTIVE DEFENSE
General 6-1
Operational Force Protection 6-2
Active Defense Organization 6-2
Force Projection Planning 6-4
Stages I and II—Mobilization and Predeployment 6-5
Stages III and IV—Deployment and Entry Operations 6-7
Stage V—Decisive Operations 6-8

Stages VI and VII—Redeployment and Post Conflict 6-9
Stage VIII—Demobilization 6-9

Chapter 7 PASSIVE DEFENSE
General 7-1
Passive Measures 7-1
Passive Defense Organization 7-8
Warning 7-9
Force Projection Planning 7-16
Stages I and II—Mobilization and Predeployment 7-17
Stages III and IV—Deployment and Entry Operations 7-18
Stage V—Decisive Operations 7-21
Stages VI and VII—Redeployment and Post Conflict 7-21
Stage VIII—Demobilization 7-22
Summary 7-22

Appendix A INTELLIGENCE PREPARATION OF THE BATTLESPACE A-1

Appendix B AIR AND MISSILE DEFENSE ANNEX B-1

Appendix C THEATER MISSILE DEFENSE COMMUNICATIONS C-1

Glossary Glossary-1

Bibliography Bibliography-1

Index Index-1

Preface

Field Manual (FM) 100-12, *Army Theater Missile Defense Operations*, establishes the Army's comprehensive doctrine to guide actions throughout the range of theater missile defense (TMD) operations. It explains the Army's contribution to joint TMD and addresses the elements necessary to insure maximum effectiveness and integration of TMD into the Joint Force Commander's (JFC's) overall concept of the operation and campaign objectives.

This manual provides the doctrinal base for integrating the US Army Air and Missile Defense Command into Army-level command and control architecture and operations. It provides information on requirements necessary for successful coordination of TMD in support of Army, joint, and multinational operations. This manual implements relevant joint doctrine, incorporates lessons learned from recent operations, conforms to the Army's keystone doctrine, and provides information on the theater missile threat to US forces and US interests.

FM 100-12 provides doctrinal guidance for commanders, staff, trainers, and leaders at all levels and is the doctrinal basis for Army Service School curriculum development. It also provides a doctrinal basis for implementation of TMD measures in all Army units. The contents apply to Army TMD worldwide.

The proponent for this manual is the US Army Training and Doctrine Command (TRADOC). Send comments and recommendations on DA Form 2028 directly to Commandant, US Army Air Defense Artillery School ATTN: ATSA-DOT-D, Fort Bliss, Texas 79916-3802.

Unless this publication states otherwise, masculine nouns or pronouns do not refer exclusively to men.

Chapter 1

Introduction

This chapter introduces Army theater missile defense (TMD) operations in the context of joint TMD. It provides the framework in which doctrinal guidance to Army commanders at strategic, operational, and tactical levels is given.

GENERAL

1-1. Theater missiles (TMs) are ballistic missiles (BMs), cruise missiles (CMs), and air-to-surface missiles (ASMs) whose targets are within a given theater of operation. Advanced missile technologies coupled with weapons of mass destruction (WMD) or weapons of mass effect (WME) capabilities have become proliferated among potential adversaries and provide them with potentially decisive attack capabilities. The TM threat is as much a political weapon as a military weapon.

1-2. The preferred method to counter enemy TMs is to destroy or disrupt operations prior to launch. Failing that, the capability to intercept and destroy missiles in flight is the next most desired option. The capabilities of joint force components, supporting Commanders in Chief (CINCs) and multinational forces must be integrated to achieve the common objective of neutralizing or destroying the enemy's TM capabilities. This effort must be integrated into and support the Joint Force Commander's (JFC's) overall concept of operations and campaign objectives.

THEATER MISSILE DEFENSE

1-3. TMD encompasses all activities focused on the identification, integration, and employment of forces supported by theater and national capabilities to detect, identify, locate, track, discriminate, minimize the effects of, and destroy enemy TMs. This includes the destruction of TMs on the ground and in flight; their air, ground, or sea-based launch platforms during pre- and post-launch operations; and their supporting infrastructure.

1-4. TMD is inherently a joint mission. Successful conduct of TMD requires a coordinated joint service effort. This coordination originates in the doctrine described in Joint Publication (JP) 3-01.5 and supporting service publications. The Air Force's contribution to joint TMD is described in Air Force Doctrine Document 2-1.1 *Counterair Operations*. The Navy's contribution to joint TMD is described in Naval Warfare Publication 3-0.1. The Marine Corps' contribution to joint TMD is described in Marine Corps Warfighting Publication 3-25 *Control of Aircraft and Missiles*. The Army's role in the joint TMD fight is the focus of this manual.

1-5. All service components have the capability to make critical TMD contributions. The Army's contribution is derived from four specific Department of the Army functions contained in Department of Defense (DoD) Directive 5100.1:

- Organize, train, and equip forces to seize, occupy, and defend land areas.
- Organize, train, equip, and provide forces for theater air and missile defense (TAMD).
- Organize, train, equip, and provide forces to operate land lines of communication (LOC).
- Develop doctrines and procedures, in coordination with the other military services, for organizing, equipping, training, and employing forces operating on land.

1-6. The Army Air and Missile Defense Command (AAMDC) is the Army's combat organization for planning, coordinating, integrating, and executing TMD operations in support of the Army Service Component Commander (ASCC), the Army Forces (ARFOR) Commander, the Joint Force Land Component Commander (JFLCC), if designated, and the JFC's joint TMD fight. When supporting the JFC campaign, extensive coordination and support to the Joint Force Air Component Commander (JFACC) is often required. See FM 44-94 for detailed information on the AAMDC organization and capabilities.

IMPACT OF THEATER MISSILES ON MILITARY OPERATIONS

1-7. TMs threaten Army and joint force operations throughout the full range of military operations—from war to stability and support operations (SASO). During the Gulf War, the US-led coalition diverted a significant number of air assets to counter the theater ballistic missile (TBM) threat in Iraq. Potential adversaries have learned lessons from the Gulf War and may be expected to employ TMs to threaten US allies prior to the outbreak of armed conflict, and US assets during force projection operations. China and North Korea have used TBM test flights and system deployments to apply political pressure on the governments of Japan, South Korea, and Taiwan causing an US TMD reaction to mitigate the pressure. To counter the Iraqi TBM threat, the US has deployed Army TMD forces to southwest Asia to protect joint forces and geopolitical assets.

1-8. Army TMD attack capabilities permit the commander to actively shape the joint TAMD battlespace during war or SASO. Prior to the outbreak of armed conflict, they provide the capability to preemptively destroy or degrade the enemy's ability to conduct a limited warning initial attack. After the outbreak of war, they reduce the quantity of enemy TMs that active defenses must defeat to protect both joint force operations and geopolitical assets. Attack forces provide these capabilities until the TM threat is nullified or hostilities cease.

1-9. Army TMD active defense units play a vital role in joint TMD during war or SASO. Prior to the outbreak of armed conflict, they mitigate the risk to the geopolitical assets of US allies and forward stationed US forces from a limited warning initial attack. After the outbreak of war, they protect joint and

coalition forces and geopolitical assets until the TM threat is nullified or hostilities cease.

1-10. Army TMD passive defense readiness provides vital joint TMD capabilities for both war and SASO. Prior to the outbreak of armed conflict, they provide the capability for geopolitical assets of US allies and forward-stationed US forces to reduce the impact of a limited warning initial attack employing WMD/WME. As an example, the threat of Iraqi TBM operations employing WMD/WME caused the government of Israel to prepare their population for WMD/WME attacks through the issue of protective clothing and equipment and training on its use. The US supported this preparation through dissemination of shared early warning, ensuring that the people of Israel were alerted in sufficient time to employ their protective clothing and equipment. In the future after the outbreak of war, passive defense capabilities will continue to protect both joint force operations and geopolitical assets until the TM threat is nullified or hostilities cease.

1-11. Army TMD command, control, communications, computers, and intelligence (C^4I) capabilities allow the commander to integrate military operations across the joint TMD battlespace during war or SASO. Prior to the outbreak of armed conflict, they provide the capability to detect the enemy's intent to conduct or initiate a limited warning initial attack and facilitate preemptive attack and responsive defensive operations. After the outbreak of war, they permit the coordination and integration of attack operations, active defense, and passive defense ensuring seamless protection of both joint force operations and geopolitical assets. C^4I organizations provide these capabilities until the TM threat is nullified or hostilities cease.

THEATER MISSILE DEFENSE ROLE IN FORCE PROTECTION AND COUNTERING WEAPONS OF MASS DESTRUCTION

1-12. The role of TMD is to support the national military strategy's capability requirements for countering WMD/WME by protecting personnel and materiel, conducting precision strike, and achieving information dominance. TMD protects the force's fighting potential so that it can be applied at the appropriate time and place. TMD forces usually fulfill this role as part of joint or multinational forces. Protecting the force during initial entry until the TM and WMD/WME threat is nullified or hostilities cease requires employment of a host of TMD weapons and command and control (C^2) systems. TMD provides combatant commanders with the ability to protect critical assets such as population centers, logistical bases, C^2 centers, and land-based forces from the TM and WMD/WME threat. Additionally, TMD helps the combatant commander project, protect, and sustain friendly forces by defending airports and seaports of debarkation (APODs/SPODs) and LOCs against TM and WMD/WME interdiction.

THEATER MISSILE DEFENSE THREAT ENVIRONMENT

1-13. TMD requires the use of tactics and techniques that differ from those used to counter traditional aircraft threats. Target trajectories present different approach aspects to sensors. This requires that all TMD participants understand TM flight characteristics.

1-14. Due to the inherent nature of aircraft operations, enemy aircraft are exposed to longer engagement times, whereas TBM engagement opportunities are measured in seconds due to the flight trajectories and increased speeds that TBMs attain. Exposure time to TMD systems for engagement may be shorter (depending on range) in duration when compared to aircraft flight paths. The shorter acquisition and detection time window for TBMs directly impacts early warning and reaction time to defeat the TBM threat. Warning information and predicted impact points must be transmitted as quickly as possible throughout the theater of operations, especially if WMD/WME are suspected. Decentralized execution for engagements is imperative to counter the TBM threat since reaction time is critical.

1-15. Additionally, CMs and ASMs provide a very different set of engagement characteristics that must be countered. Both are reliable, accurate, survivable, and lethal. CMs can be launched from the land, air, or sea; and like ASMs, they are difficult to detect, can fly indirect routes (low or high) to avoid heavily defended areas, and can attack from any direction. CMs can strike targets with pinpoint accuracy, and, if smart submunition warheads are used, they could strike moving targets as well. A variety of special purpose munitions, including WMD/WME, may also be carried by CMs and ASMs.

1.16. The unique challenges posed by TMs require a rapidly responsive C^4I structure, which decentralizes active defense engagement operations to the lowest level, provides timely and accurate targeting information for attack operations, and provides timely and accurate early warning for passive defense. By comparison, the requirement to avoid fratricide of friendly aircraft mandates stricter, more centralized control of engagement operations against traditional aircraft threats.

OBJECTIVES OF JOINT THEATER MISSILE DEFENSE

1-17. There are five objectives of joint TMD as stated in JP 3-01.5:

- To demonstrate US resolve to deter aggression through the establishment of a TMD capability.
- To protect US-deployed, allied, and coalition forces; critical assets; and areas of vital interest or political importance from attack by TMs.
- To detect and target threat TM systems; to detect, warn, and report a TM launch; and to coordinate a multifaceted response to a TM attack, integrating that response with other combat operations.
- To reduce the probability of and/or minimize the effects of damage caused by a TM attack.
- To ensure that the JFC has the freedom to conduct joint operations without undue interference from TM operations conducted by the enemy.

OPERATIONAL ENVIRONMENT

1-18. JP 3-01.5 states that TMD systems should build on existing systems and doctrine and, when appropriate, incorporate the newest technologies and concepts. All TMD systems must be integrated into existing C^4I architectures.

OPERATIONAL ELEMENTS OF THEATER MISSILE DEFENSE

1-19. TMD is composed of four operational elements: passive defense, active defense, attack operations, and C^4I. Because of the continual advancement and proliferation of TMs, the threat cannot be quickly countered by any single technical solution. The threat can only be countered by the synergy achieved by coordinating and integrating all four operational elements into cohesive and coherent combat operations (see Figure 1-1).

PASSIVE DEFENSE **Applies to Measures to:** • Reduces vulnerability • Minimize damage **Includes:** • Deception • NBC protection • Theater missile early warning • Electronic warfare • Countersurveillance • Recovery and reconstitution • Camouflage and concealment • Mobility, dispersal, and hardening	***ACTIVE DEFENSE*** **Applies to Measures to:** • In-flight destruction • Destruction of airborne launch platforms **Includes:** • Multitiered defense in-depth via multiple engagement using land, sea, air space, and Special Operations Forces • Active electronic warfare to disrupt remote or onboard guidance systems • Reconnaissance, surveillance, target acquisition platforms
ATTACK OPERATIONS **Applies to Measures to:** • Offensive action by land, sea, air, space, and Special Operations Forces **Includes:** • Destruction, disruption, or neutralization of theater missile launch platforms; supporting command, control, and communications; logistics; and reconnaissance, surveillance, and target acquisition platforms	***COMMAND, CONTROL, COMMUNICATIONS, COMPUTERS, AND INTELLIGENCE*** **Includes:** • Timely and accurate data and systems to plan, monitor, direct, control, and report TMD operations • Integrated systems of doctrine, organizational structures, facilities, communications, computers, supporting intelligence, and missile warning and cueing by sensors and ground stations

Figure 1-1. Theater Missile Defense Elements

ARMY IN JOINT THEATER MISSILE DEFENSE

1-20. Army TMD capabilities are integrated with those of the other services to provide a cohesive TMD effort. Army, national, and theater intelligence, surveillance, and reconnaissance (ISR) assets will be used to detect and track the movement of TM launch platforms, cue TMD active defense and attack operation forces for engagements, and warn the force of TM launches. Army

aviation and fire support units provide the JFC with responsive attack operations capabilities to complement friendly offensive aircraft and CMs. Army air defense artillery (ADA) weapons systems execute a major role in active defense and a supporting role in attack operations. Commanders at all levels ensure the appropriate passive defense measures are taken to execute force protection. An integrated C4I system will be established to integrate all the elements of TMD at the Army, joint, and multinational level. Army TMD elements will form a cohesive TMD force with the other components and multinational forces that is synchronized, integrated, synergistic, fused, and seamless to provide protection of theater forces and critical assets (see Figure 1-2).

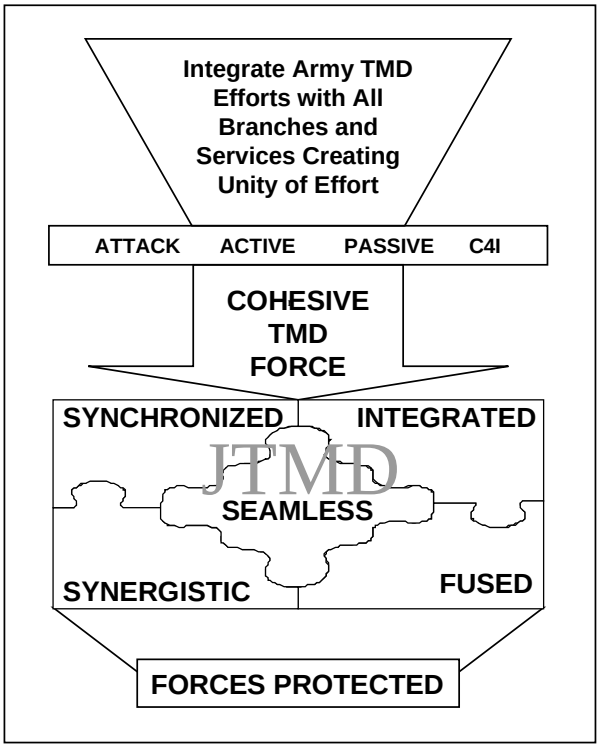

Figure 1-2. Joint Theater Missile Defense

THEATER MISSILE DEFENSE IMPERATIVES

1-21. TMD operations require that certain actions be performed to be successful. These imperatives are planning, unity of effort, integration, synchronization, and decentralized execution.

PLANNING

1-22. Upon completing the estimate of the situation, the joint or multinational force commander provides the concept and mission priorities to subordinate commanders. This initiates the Army TMD planning process. Integrated Army TMD planning is focused on effective use of attack operations, active defense, and passive defense. This planning process is

multi-echelon, collaborative, iterative, and distributed. Intelligence capabilities are identified and designated for TM detection, acquisition, and identification during intelligence preparation of the battlespace (IPB). Priorities and rules of engagement (ROE) are established for engaging both attack operations and active defense. Critical assets, capabilities, areas, and units requiring defense are identified and prioritized. Units receive missions and commanders task organize to protect critical assets or areas of the theater, fleet operating areas, and battlefield forces.

UNITY OF EFFORT

1-23. The ASCC is responsible for properly employing ARFOR and accomplishing operational tasks assigned by the JFC. When the ARFOR is the dominant land force conducting major operations, the ARFOR Commander may be designated as the JFLCC by the JFC. The ASCC establishes the link between the ARFOR and the joint command. This commander plans and executes operations in support of the joint campaign, plans and executes support operations to sustain subordinate ARFOR, and provides support to other services. The ARFOR accomplishes unity of effort in TMD operations through the exercise of command over all assigned forces. The various types of operations conducted in support of the concept of operations should be complementary and aimed at fulfilling the overall mission objectives.

INTEGRATION

1-24. TMD must be integrated into every aspect of operations. TMs can disrupt military operations and the political situation. Force protection is a command responsibility, and commands at all levels must integrate passive TMD measures to enhance force protection. The ARFOR staff and AAMDC ensure overall TMD operations and plans support the commander's concept of operations and are coordinated and integrated with joint and multinational forces' plans and considerations.

SYNCHRONIZATION

1-25. TMD-capable units must see beyond their immediate tasks and objectives to recognize how their efforts fit within the concept of operations. These individual units will be part of an integrated TMD system of systems designed to counter the full range of TMs. Commanders must integrate and synchronize their TMD functions and operations horizontally across all battlefield operating systems and vertically with higher and lower TMD capable Army and joint forces. Deep, close, and rear operations will require continuous and simultaneous TMD support in accordance with the overall ARFOR mission and plans.

DECENTRALIZED EXECUTION

1-26. Active defense and attack operations should be decentrally executed according to joint doctrine and multinational procedures. Decentralized execution is necessary because the number of activities associated with TMD operations and the time sensitive, stressing nature of the threat prevent a single commander from effectively controlling all TMD forces and actions. An

enemy TM launch observed and identified through surveillance systems triggers early warning, active missile defense, and possible attack operations. Passive defensive actions by military units and civilian authorities are continuous in nature and inherent in all combat operations. Execution of active defense and attack operations should be decentralized down to the ADA, field artillery, and aviation unit levels to allow the units to engage TMs and their supporting infrastructure quickly and efficiently. The C^4I system links active defense, passive defense, and attack operations capabilities to provide:

- Timely assessment of the threat.
- Rapid dissemination of tactical or operational warning.
- Targeting data.
- Mission assignment.
- Post strike assessments to the appropriate TMD element.

1-27. For each operational element, the C^4I system must provide data and voice communications among intelligence assets, decision-making nodes, warning systems, and weapon systems, to include a capability for rapid coordination with comparable joint and multinational TMD assets. C^4I capabilities must support centralized control, decentralized execution, and coordinated efforts by units assigned TMD missions.

ARMY UNIVERSAL TASKS

1-28. The following tasks are integral to the Army's successful conduct of TMD operations. The tasks include: deploy/conduct maneuver, develop intelligence, employ firepower, perform logistics and combat service support (CSS), exercise C^2, and protect the force. These tasks are discussed at the tactical level of war.

DEPLOY/CONDUCT MANEUVER

1-29. Maneuver is the movement of combat forces to gain positional advantage, usually in order to deliver—or threaten delivery of—direct and indirect fires. This includes the employment of forces on the battlefield in combination with fire (direct and indirect fire) or fire potential. Maneuver and firepower are inseparable and complementary dynamics of combat. Although one might dominate a phase of battle, the synchronized effects of both are essential to achieve success on the battlefield. Additionally, maneuver forces may be employed to conduct TMD attack operations. Maneuver assets are integrally involved in passive defense. Commanders must be cognizant of passive defense measures needed before, during, and after TM attacks. Maneuver units also play a major role in countering enemy reconnaissance, surveillance, and target acquisition (RSTA) assets from collecting information on possible TM targets.

DEVELOP INTELLIGENCE

1-30. Intelligence is an important factor in all the operational elements of TMD. The IPB process defines the battlefield environment, describes the battlefield effects, evaluates threat capabilities and vulnerabilities, and determines possible enemy courses of action. When tailored specifically to

analyze the TM threat, it provides commanders the required intelligence to plan and integrate effective TMD operations across all four operational elements. The intelligence section of the AAMDC develops the intelligence analysis requirements for TMD operations and forwards their intelligence requirements to the ARFOR analysis and control element (ACE). The ACE integrates these requirements into the overall collection plan in order to provide commanders with sufficient information for accurate targeting and situational awareness.

EMPLOY FIREPOWER

1-31. Employing firepower requires the collective and coordinated use of target acquisition data, direct and indirect-fire weapons, armed aircraft (including helicopters), Special Operations Forces, and other lethal and nonlethal means against land, sea, air, and space targets throughout the tactical battlespace. The fires system provides a wide variety of striking power in combined arms operations for execution of TMD operations. The field artillery is the primary Army provider of long-range rocket and missile fires for TMD attack operations, and the Deep Operations Coordination Cell (DOCC) is the integrating point for all elements of deep fire support. Army aviation attack assets are also units conducting deep operations to destroy the enemy's TM infrastructure.

PERFORM LOGISTICS AND COMBAT SERVICE SUPPORT

1-32. CSS forces are involved in TMD in two ways. First, they conduct passive defense operations at key TM targets, such as ports and LOCs. Second, they provide the supplies (primarily Class IV and V) required by other elements to perform their roles in TMD. Logistics and CSS tasks must be executed to arm, fuel, fix, man, and move the force and sustain the soldiers. *Arming* is the providing of munitions to the force. *Fueling* is the providing of required fuels (petroleum, oils, and lubricants) to weapon systems and other equipment. *Fixing* transcends maintenance in that it preserves the availability of weapon systems and equipment and includes the provision of repair parts. *Manning* is the provision of soldiers to commanders. *Moving* relates to planning and executing movements of personnel, equipment, and supplies in the performance of CSS. *Sustaining* soldiers and their systems involves provision of a wide range of services and supplies. Logistics and CSS incorporate a variety of technical specialties and functional activities, to include maximizing the use of available host nation infrastructure and contracted logistics support. It provides the physical means with which forces operate, from the production base and replacement centers in the US to soldiers in contact with the enemy. As the scale and complexity of Army operations increases, the importance of logistics to their success increases as well.

EXERCISE COMMAND AND CONTROL

1-33. C^2 is the exercise of authority and direction by a properly designated commander over assigned forces in the accomplishment of the mission. C^2 tasks are performed through an arrangement of personnel, equipment, communications, facilities, and procedures employed by the commander in planning, directing, and controlling forces and operations in the

accomplishment of the TMD mission. The conduct of TMD operations is complex and time sensitive, placing great demands on the C^2 system that requires high-speed computers and communication support. The integration of C^2 with computers, communications, and intelligence into a C^4I system links passive defense, active defense, and attack operations into cohesive Army TMD operations. New information technologies allow integration of existing capabilities in ways that renew emphasis on the military requirement for information dominance. Information dominance is the ability to use information and capabilities to achieve an operational advantage. In modern operations, the side possessing better information has a critical, perhaps decisive, advantage over any opponent. In broad terms, joint and Army commanders orchestrate a variety of capabilities to achieve a more coherent understanding of their battlespace than the opponent.

PROTECT THE FORCE

1-34. Protecting the force includes TAMD, which encompasses all measures designed to nullify or reduce the effectiveness of attack by hostile aircraft or TMs. It also includes classifying airborne platforms, which are distinctive to TAMD systems, and defending against attacking air and missile targets by lethal and nonlethal means. TAMD assets are the primary units conducting the active defense mission of Army TMD. The role of TAMD units is to engage TMs during flight or to destroy the airborne TM launch platforms. TAMD units will also defend the theater of operation from all TMs and non-TMs to include airborne RSTA platforms collecting targeting information.

1-35. Passive defense measures also provide protection to the force and should be employed by all commanders. Mobility and survivability are important passive defense measures in areas vulnerable to TM attacks. Mobile, dispersed, and hardened units have an increased chance of surviving a TM attack. Passive defense becomes more critical when TMs are armed with WMD/WME because of the increased possibility of casualties in comparison to conventional munitions effects.

OVERVIEW OF THE MANUAL

1-36. The manual contains the following chapters:

- Chapter 2 discusses the TM threat to Army operations, TM threat systems, and potential adversaries.
- Chapter 3 examines the integration of Army TMD operations with joint TMD operations.
- Chapter 4 discusses how C^4I systems are established and how connectivity is accomplished.
- Chapter 5 addresses attack operations to destroy TM infrastructures.
- Chapter 6 describes the active defense measures taken to destroy TMs in flight.
- Chapter 7 discusses the passive defense measures taken to reduce unit vulnerability to TM attack and to minimize the effects of their damage.

1-37. While the focus of this manual is Army TMD operations during war, the Army may conduct TMD across the full range of military operations. The Army conducts such operations as part of a joint team and often in conjunction with other US and foreign government agencies. Whether the Army conducts TMD as part of peacekeeping operations, peace enforcement, or a show of force, the principles described throughout this manual are applicable when tailored by mission, enemy, terrain and weather, troops, time available, and civilian considerations (METT-TC).

Chapter 2

Threat

> *"...the proliferation of nuclear, biological, and chemical weapons ('weapons of mass destruction') and the means of delivering such weapons, constitutes an unusual and extraordinary threat to the national security, foreign policy, and economy of the United States..."*
>
> *President Bill Clinton*
> *November 12, 1997*

This chapter outlines the threat to deployed US and multinational forces, LOCs, logistics facilities, and population centers from aerial attack by theater missiles. Under joint doctrine (JP 3-01.5), TMs include BMs, CMs, and ASMs whose targets are within a given theater of operation. Overviews of TM threat systems—what makes them threatening and their future trends—appear first, followed by examinations of selective countries whose current or emerging capabilities could present regional challenges. Information presented in this chapter was obtained from the Office of the Secretary of Defense and other open-source documents, such as the Air Defense Artillery School's *Air and Missile Defense Master Plan*.

GENERAL

2-1. The evolving threat will take on new, stressing characteristics in the 21st century. Adversaries will closely observe emerging US capabilities in an effort to identify and exploit weaknesses using asymmetric approaches. An asymmetric approach seeks to negate US capabilities by simple counters and avoids a direct match with US strengths. Fundamental capabilities that 21st century adversaries may pursue to counter US strengths include WMD/WMEs, unmanned RSTA platforms, precision strike, large numbers of inexpensive rockets, low-observable CMs, and information warfare. Some states will rely on asymmetric capabilities as a substitute for, or complement to, large conventional forces. Regional competition will reinforce the perceived need to acquire unmanned systems that provide high operational effectiveness for nominal cost.

2-2. Ownership of ballistic and aerodynamic systems that can strike well beyond national borders and produce mass destruction is often a source of stature in the international community. These weapons confer strategic status to the countries possessing them. Thus, a country concerned with

improving the perception of its military capabilities may be tempted to acquire such systems even if it does not intend to use them.

2-3. The traditional air threat, fixed and rotary-wing aircraft, will still exist in the world of tomorrow. Fixed-wing aircraft will continue to evolve as expensive, but highly capable, multi-role weapon systems. Rotary-wing aircraft (that is, helicopters) will continue to pose a significant lethal hazard for ground forces with both improved night and standoff capabilities. While these threats are still formidable, the proliferation trend in the 21st century is toward the unmanned threat—TBM, CM, ASM, unmanned aerial vehicle (UAV), large-caliber rocket (LCR) and multiple launch rockets (MLRs).

2-4. Factors of cost, training, operational need, and strategies to counter enemy capabilities rather than match them drive the trend toward unmanned threats. TMs provide a cost-effective alternative to aircraft. For example, a single SS-1c/Scud system costs a small fraction of a fixed-wing aircraft. Significant numbers of TMs or UAVs can be acquired for the price of one or two highly sophisticated aircraft, without the attendant costs of training, maintaining, basing, and sustaining a manned aircraft fleet. Figure 2-1 illustrates the cost advantage of unmanned systems.

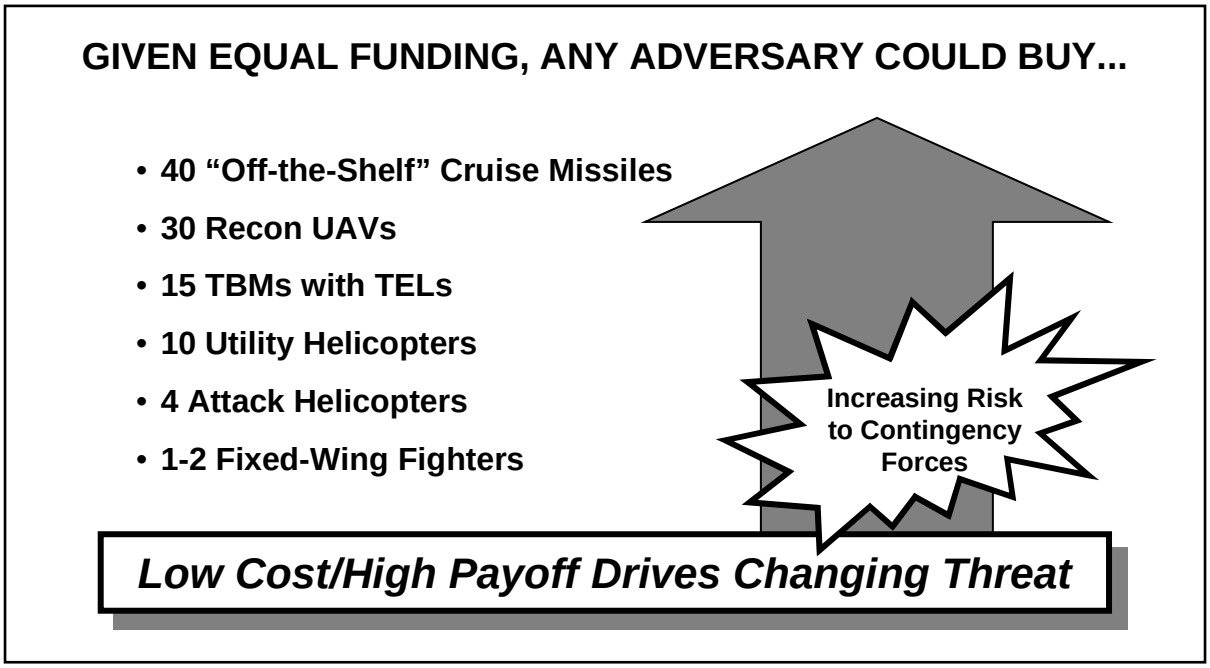

Figure 2-1. Unmanned Systems Cost Advantage

2-5. The advantages of unmanned systems may be worth their economic cost. These systems possess inherent lethal capabilities, and they are increasingly available on the world market. Since most developing nations have virtually no effective defense against a TM threat, TMs provide an excellent deterrent. Investment in substantial numbers of these may have a higher payoff value than an equal value investment in manned systems.

2-6. Sophisticated and rudimentary versions of these unmanned systems pose a danger to deployed US military forces. TBMs and CMs can deliver WMD/WME on deployed forces or geopolitical assets. RSTA UAVs can detect US force operations and provide the basis for near real-time targeting, leading to potential disruption of decisive operations. LCRs and MLRs pose special hazards and challenges across the spectrum of operations.

HISTORICAL PERSPECTIVE

2-7. The military and political use of TMs by other countries since World War II is increasing. Table 2-1 lists TM use events in chronological order.

Table 2-1. Theater Missile Use By Other Countries Since World War II

YEAR	*EVENT*	*MISSILE*
1973	Egyptian and Syrian attacks on Israel	FROG/Scud
1980-88	Iran-Iraq War	FROG/Scud
1986	Libyan attacks on US Coast Guard Base, Lampedusa, Italy	Scud
1989-91	Afghan Government use on Mujahideen	Scud
1991	Iraqi attacks during the Persian Gulf War on Bahrain, Israel, and Saudi Arabia	FROG/Scud
1993	North Korean missile tests	Scud/No Dong
1993-95	Yugoslav Civil War	FROG/SA-2
1994	Yemeni Civil War	Scud/Scarab
1995	Iran-Iraq border clash	Scud/SA-2
1995-96	Chinese missile tests	M-9
1998	North Korean missile test	Taepo Dong
1998	Pakistani missile test	Ghauri

THEATER MISSILE THREAT TO ARMY OPERATIONS

2-8. TMs are unique weapon systems. Their capabilities give a country the ability to attack US and multinational forces, LOCs, logistics facilities, and population centers from the beginning to the end of hostilities. During force projection operations, TM targeting requirements will evolve as the political and military situation changes and the availability of threat TM systems change during the conflict.

STAGES I AND II—MOBILIZATION AND PREDEPLOYMENT

2-9. The TM threat is to in-theater US and multinational forces and other assets. Therefore, the TM threat during mobilization and predeployment operations of US forces is limited. The enemy may conduct a preemptive strike with the intent of preventing or seriously disrupting US deployment operations. This could be achieved by influencing the US will to commit forces, or through the destruction of key deployment infrastructure. Enemy TM targeting requirements will be relatively the same against in-theater US as well as multinational allied forces during this stage.

STAGES III AND IV—DEPLOYMENT AND ENTRY OPERATIONS

2-10. Initially the operational objective of TM forces may be to slow the flow of forces into the area of operations (AO) and cause enough casualties to influence US public opinion against national involvement. TMs may be used against such high-value targets such as APODs, SPODs, logistic sites, TMD forces, marshaling and staging areas, and political targets.

2-11. TBMs will probably be the enemy weapon system of choice during these operations. Their high survivability, range, penetration, and warhead options make them ideal during most phases of operations. Their lethality allows them to be effective against population centers and to disrupt operations at APODs and SPODs.

2-12. Enemy fixed-wing or rotary-wing aircraft operations may peak during this stage, especially if enemy forces launch a preemptive strike. Although enemy aircraft may suffer a high attrition rate, the threat of aircraft armed with CMs and ASMs will continue to exist throughout this phase. Air-launched weapons will probably be fired at maximum range, possibly limiting the effectiveness of friendly active defenses against the launching aircraft.

2-13. Land attack CMs (LACMs) will probably be used to target APODs and SPODs, but can be used against virtually any fixed target. Cargo and transport ships may be attacked with CMs while in SPODs. LACMs are most likely to be employed in precision strikes against high-value targets, but may be used to deliver WMD/WME payloads.

STAGE V—DECISIVE OPERATIONS

2-14. The enemy weapon systems active during entry operations will be active during the decisive operations stage, and their target lists will be expanded to include troop concentrations and choke points. Nuclear, biological, and chemical (NBC) weapons may be used to disrupt and delay operations. It can be assumed that fixed-wing aircraft levels will decrease during this stage, lowering, but not eliminating, the ASM and air-launched CM threat.

STAGES VI, VII, AND VIII—POST CONFLICT THROUGH DEMOBILIZATION

2-15. Enemy TM system operations should be limited during these stages, though history has proven that TBMs are highly survivable and mobile ground-launched CMs have a similar potential. Large concentrations of forces throughout these three phases prove to be easy targets for both TMs and CMs. However, further enemy use of TM systems would reinitiate hostilities, so their likelihood of use should be reduced.

THEATER BALLISTIC MISSILES

2-16. TBMs include short-range ballistic missiles (SRBMs) with ranges up to 1,000 km and medium-range ballistic missiles (MRBMs) with ranges from 1,000 to 3,000 km. These are surface-launched missiles with ballistic trajectories. TBMs, often launched from highly mobile, difficult-to-detect transporter erector launchers (TELs), have the capability to carry WMD/WME. Most TBMs are single-stage missiles with a circular error

probable (CEP) accuracy of one-tenth of one percent of the range. State-of-the-art guidance technologies in some missiles will improve this accuracy too less than 50 m. Figure 2-2 displays a number of TBM threats.

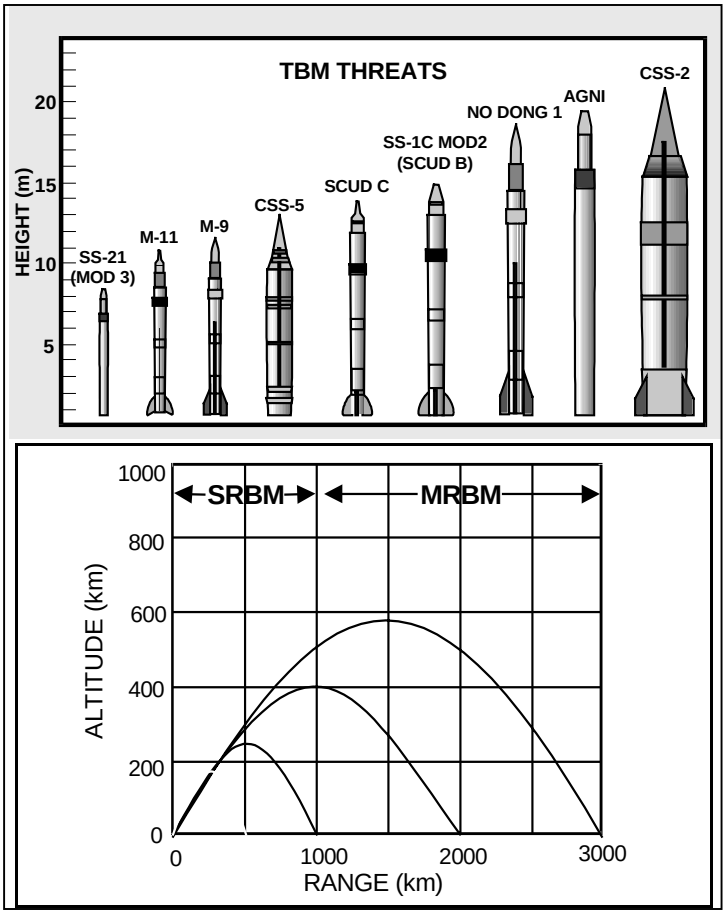

Figure 2-2. Theater Ballistic Missiles Threats

2-17. TBMs are inherently difficult to defend against. Characteristics that increase TBM effectiveness include a reduced radar cross section (RCS), high terminal velocity, reduced notification time for defending forces, a variety of difficult-to-kill warheads, and an all-weather capability. Figure 2-3 (see page 2-6) illustrates the threatening characteristics of TBMs.

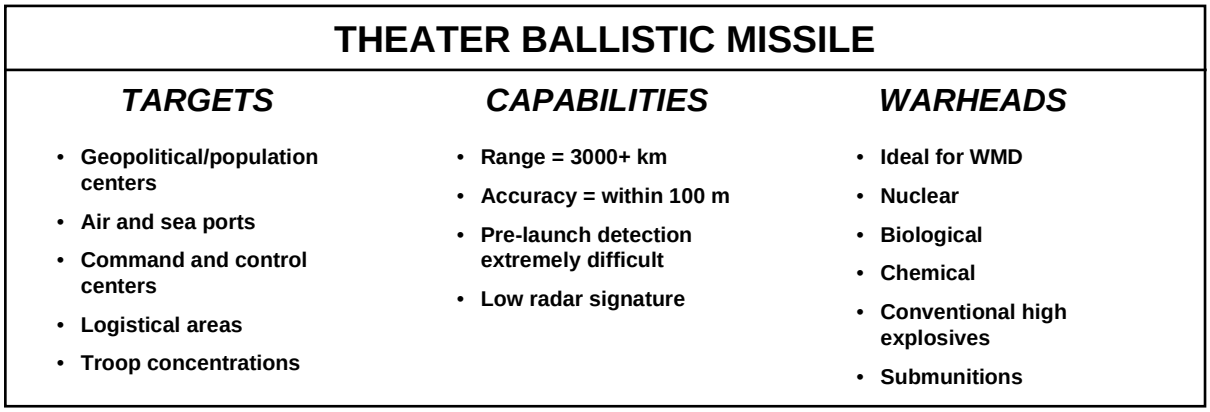

Figure 2-3. Features That Make Theater Ballistic Missiles Threatening

2-18. The major TBM trends are increased range and improved accuracy. Currently, many potential adversaries employ inaccurate TBMs targeted at fixed military targets and population centers. However, the TBM lack of accuracy is offset by the use of WMD/WME warheads or submunitions. As potential adversaries acquire TBMs with improved accuracy, range, and payload capacity, TBMs will become more tactically effective. Integration of global positioning system (GPS) and terminal guidance are the current focus of improving accuracy. Also, the trend in modern missile systems has been toward the use of solid propellants because of the reduced logistical requirements and simplicity of operations. Solid fuels and multiple staging will increase TBM payloads and ranges. Improved TBMs may target C^2 nodes, air defense sites, fire support sites, assembly areas, and logistics concentrations. They can be used to exploit choke points and create obstacles. This will be facilitated through the use of military and commercial satellite support, UAVs, and real-time news reporting.

2-19. For most potential adversaries TBMs are strategic systems, organized in former Soviet-style Strategic Rocket Forces (SRF) units. As a result the decision to commit TBMs will be strategic rather than tactical. Orders, including targeting data and launch site location, will be passed via fixed national communications channels rather than mobile tactical channels. Generally, TBM brigades and battalions will serve as communications relays and sources of logistical support. Firing batteries will direct TELs to emerge from protected locations, move to prepared launch sites, fire TBMs, and then return to protected locations for reload operations. These operations will generally occur during periods of darkness and poor weather to reduce the effectiveness of TMD attack operations.

2-20. The organization of TBM forces on strategic lines provides vulnerabilities that can be exploited. Strategic operations reduce the operational flexibility of the adversary TBM force. National authorities will tend to employ TBMs against predictable fixed geopolitical assets and facilities, allowing our active defenses to mass. The exercise of national command authority will slow both the target selection and passing processes, allowing our passive defenses time to regenerate between attacks. The operation from strategic fixed locations provides years of intelligence

collection; facilitates our identification of TBM C^2, communications, hide sites, launch sites, and logistics facilities; and allows high confidence attack operations.

LARGE-CALIBER AND MULTIPLE LAUNCH ROCKETS

2-21. While technically not missiles, LCRs and MLRs appear with TBMs in this document because their size, trajectory, warheads, and battlefield targets are similar to those of SRBMs. LCRs are different from SRBMs in that they do not have onboard guidance and, thus, are unguided throughout their flight. Typical LCR systems are the Russian Luna M or free rocket over ground (FROG) series and the US Honest John. MLRs also lack onboard guidance, overcoming this shortfall by being employed in volleys of a hundred or more rockets on a single target. Typical MLRs are the Brazilian Astros, Russian Smerch, and US MLRS.

2-22. The ability of these systems to deliver high volumes of fire and a variety of warheads makes them ideal weapon systems for fire support missions. Highly mobile launchers effectively support forward artillery missions. This mobility and the rocket's short burn time result in little warning for maneuver forces, and their short range precludes engagement by current missile defense systems. Figure 2-4 illustrates the MLR characteristics.

MULTIPLE LAUNCH ROCKETS

TARGETS	*CAPABILITIES*	*WARHEADS*
• Assembly areas	• High rates of fire	• Ideal for massive ordnance delivery
• Missile defense/artillery locations	• Highly mobile ("shoot and scoot")	• Chemical
• Defensive positions	• Rapid reload	• High explosives
• Troops in the offense	• Area denial	• Bomblets
• Chokepoints/routes of advance	• Low signature/flight trajectory	• Mines

Figure 2-4. Features That Make Large-Caliber Rockets and Multiple Launch Rockets Threatening

2-23. MLRs are widely proliferated, and their production and sale is increasing. The high volume of fire and multiple warhead capabilities of MLRs make them a very appealing weapon system for threat nations. In the future, threat nations may incorporate simple guidance schemes, and deploy passive infrared (IR) or radio frequency (RF) warheads with these missile systems, improving their use against armor systems, C^2 nodes, and battlefield radars.

CRUISE MISSILES

2-24. CMs are unmanned, powered, self-guided vehicles that exhibit sustained flight through aerodynamic lift at one or more predetermined,

constant (cruise) altitudes and carry a warhead or other lethal payload. There are two primary missions and, thus, two types of CMs—anti-ship cruise missile (ASCM) and LACM. The Army is most concerned with the LACMs.

2-25. CMs are reliable, accurate, survivable, and lethal. They can be launched from the land, air, or sea. In flight, they are difficult to detect, can fly indirect routes (low or high) to avoid heavily defended areas, and can attack from any direction. Today's CMs can hit a target with remarkable accuracy; tomorrow's smarter and more accurate CMs will pose a far greater threat.

2-26. Only a limited number of LACMs are currently deployed. However, numerous countries (for example, China, France, Germany, Israel, Italy, Russia, and South Africa) have ongoing LACM development programs.

2-27. Emerging CMs pose serious threats because of their unique operational characteristics illustrated in Figure 2-5. The incorporation of new technologies in airframe and warhead design, propulsion systems, and guidance systems has contributed to vastly improved systems. The increased use of composite materials in airframe construction has created stronger and lighter airframes. A range of low observable and stealth technologies has reduced the RCS. The increased use of air-breathing turbojet and turbofan engines permits subsonic speeds, providing longer ranges and flight altitudes as low as 20 m above ground level (AGL). Sophisticated guidance systems, such as GPS, the inertial navigation system (INS), and terrain contour matching (TERCOM) contribute to overall accuracy and allow programming of unpredictable flight paths to optimize surprise. A terminal guidance seeker increases accuracy to less than 10 m. A wide array of conventional warheads, to include submunitions, allows targeting of both soft and hard targets. NBC weapons pose the most serious threat, but currently only Russia, France, and the US have CMs with nuclear warheads. However, the development of a chemical or biological warhead is not difficult. The May 1997 Quadrennial Defense Review report noted that the use of NBC weapons is a likely condition of future warfare and that these weapons could be delivered by several means, including CMs.

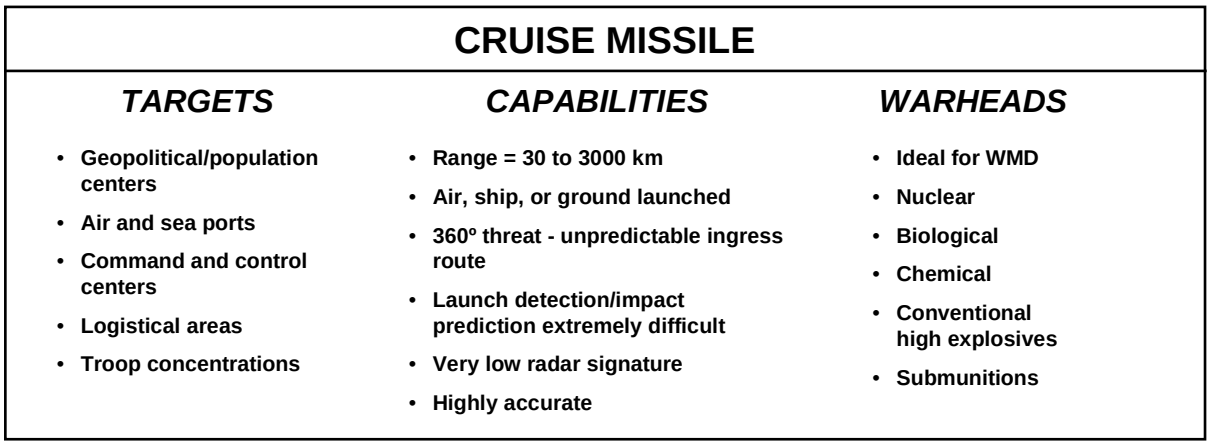

Figure 2-5. Features That Make Cruise Missiles Threatening

2-28. The success of US CM operations in the Gulf War has led to increased interest in these systems and spurred current worldwide developments. Threat experts foresee an increase in the number of LACMs within the next ten years, as well as extended ranges, improved accuracy, reduced RCSs, and increased lethality. The development of systems such as the Russian AS-18/KAZOO (Kh-59M Ovod-M), Israeli AGM-142 Popeye, and US AGM-84E Standoff Land Attack Missile (SLAM) blur the distinctions between CMs and ASMs, and their proliferation presents a grave threat to tactical operations. The addition of smart submunitions will allow the engagement of armored units on the move in the near future. CM countermeasures and evasive maneuvers are also potential future capabilities.

AIR-TO-SURFACE MISSILES

2-29. ASMs are air-launched, precision-guided munitions designed to strike ground targets. They are ideal against targets, such as bridges, that are difficult to destroy with "dumb" bombs. They are similar to air-launched CMs, but are smaller, have shorter ranges, lack the wings and aerodynamic lift associated with CM flights, and are launched by fighter-bomber aircraft. Russia and Free World countries widely export ASMs, and they are operational in numerous air forces around the world.

2-30. ASMs are an extremely lethal threat because of their versatility and pinpoint accuracy (Figure 2-6, page 2-10). Most threat ASMs are of Russian origin and employ radio command, laser, anti-radiation homing, or electro-optical (EO) guidance systems. Missiles that employ anti-radiation homing systems are referred to as anti-radiation missiles (ARMs); they represent the greatest threat to air defense, artillery (counter-battery), aviation, and intelligence radars. Most ARMs have ranges of over 100 km. An aircraft firing an ARM will usually launch from outside the lethal envelope of the air defense system being attacked. Laser-guided systems place the attacking aircraft in harm's way because of their short range, generally less than 10 km. EO or video-guided systems and ARMs offer the greatest standoff range and aircraft survivability. Some EO systems have ranges in excess of 100 km.

AIR-TO-SURFACE MISSILE

TARGETS	*CAPABILITIES*	*GUIDANCE SYSTEMS*
• Armored vehicles	• Supersonic speed (Mach 3)	• Radio command
• Radars	• Extremely accurate	• Anti-radiation (with blind-mode guidance)
• Bridges and similar "point" targets	• Short flight time	• Laser
	• Launch and leave	• Electro-optical (TV)
	• Fire and forget	• Dual mode seekers (in future)
	• Lock-on-after-launch	

Figure 2-6. Features That Make Air-To-Surface Missiles Threatening

2-31. ASMs, like CMs, are becoming smarter and more versatile, reliable, accurate, and lethal. New capabilities may include a lock-on-after-launch capability or a loitering capability to attack enemy radars (for ARM variants) and may use dual mode seekers for increased reliability and combat capability.

UNMANNED AERIAL VEHICLES

2-32. UAVs include drones, characterized by preprogrammed flight paths and patterns, and remotely piloted vehicles (RPVs), controlled by ground-based operators. Each can perform a variety of missions, ranging from reconnaissance and battlefield surveillance to attack and electronic warfare.

2-33. UAVs serve as RSTA information platforms for target detection, identification, and location; weapon targeting; target designation; and battle damage assessment (BDA) (Figure 2-7). State-of-the-art sensors and data links provide real-time targeting for fire support systems, maneuver forces, and aircraft. UAVs, equipped with laser designators, provide immediate targeting of assets for attack by smart munitions.

UNMANNED AERIAL VEHICLE

TARGETS	*CAPABILITIES*	*PAYLOADS*
• Assembly areas, logistical areas, command and control centers (seeing)	• Multimissioned - RSTA, electronic warfare, or attack	• Daylight TV and infrared video cameras
• Troop movements (seeing)	• Range = up to 1900 km	• Film cameras
• Command and control and sensor nodes (jamming)	• Altitude = 300 m to 17+ km	• Electronic intelligence
• Armored formations/systems (attacking)	• Flight time = 15 min to 48 hr	• Electronic warfare
	• Small radar signature	• HE warheads

Figure 2-7. Features That Make Unmanned Aerial Vehicles Threatening

2-34. The low RCS, low speed, and small thermal signature of UAVs make them difficult to detect and engage. Mission-dictated flight profiles take full advantage of terrain, increasing system survivability, and optimizing coverage. Flight altitudes are normally between 1,000 to 3,000 m AGL. UAVs conducting RSTA missions fly at altitudes safe from small arms fire.

2-35. UAV payloads consist of daylight television, IR video, and film cameras (for reconnaissance missions). Other major payload categories include electronic warfare (EW), electronic intelligence, radar, and attack warheads.

2-36. Several nations are developing and fielding anti-radiation homing UAVs with the primary mission of attacking battlefield RF emitters (radars, communications). These platforms have a variety of launch options and are usually fire-and-forget systems. Other attack UAV systems employ terminal guidance to kill tanks or fighting vehicles.

2-37. Threat experts project more than 50 UAV developer countries and 75 UAV user countries by 2005. In addition to information gathering (still the dominant function), UAV roles will include electronic combat, decoy, ground attack, and suppression of enemy air defense (SEAD). A significant new capability involves the direct linkage of a reconnaissance UAV to an artillery unit's fire direction center. This linkage provides near real-time information to ground commanders, followed by immediate fire and damage assessment. UAVs are also good candidates for stealth technology and spinoff technologies from CM developmental programs.

GLOBAL THREAT ENVIRONMENT

2-38. With the fall of the Soviet Union, US interests have now broadened, and the number of potential conflict areas around the world has increased dramatically. In accordance with the Defense Planning Guidance (DPG), the military may now deploy forces to many regions of the world where potential adversaries possess significant air and missile threats, including those with WMD/WME payloads. These potential adversaries are also seeking to develop nuclear weapons.

BELARUS

2-39. Belarus inherited an extensive inventory of TM systems from the former Soviet Union (FSU), to include SS-1c/Scud B and SS-21/Scarab SRBMs, and has no known chemical or biological warfare programs. While Belarus' national policy supports US and United Nations (UN) sponsored nonproliferation initiatives, serious concerns remain regarding their export policies and security measures. Belarus exports weapon systems, but it has a poor record of safeguarding weapons and nuclear material. Continued economic difficulties require massive infusions of hard currency that could be obtained through the sale of TM or WMD/WME systems or associated technologies.

CHINA

2-40. China is deeply involved in the development of BMs with capabilities that span ranges and payloads from theater to intercontinental. China has developed the following types of BMs: SRBMs (CSS-6/M-9, CSS-7/M-11, and CSS-8); MRBMs (CSS-2 and DF-21); intermediate range ballistic missile (IRBM) (CSS-3); intercontinental ballistic missile (ICBM) (CSS-4); and submarine launched ballistic missile (SLBM) (JL-1). It is aggressively seeking markets for its weapons industry (for example, China has exported the CSS-2 to Saudi Arabia, the CSS-8 to Iran, and M-11 to Pakistan). The transfer of Chinese missile and nuclear technology to potential threat countries adds to the threat facing the US and its allies. The range capabilities of Chinese BM systems are shown in Figure 2-8.

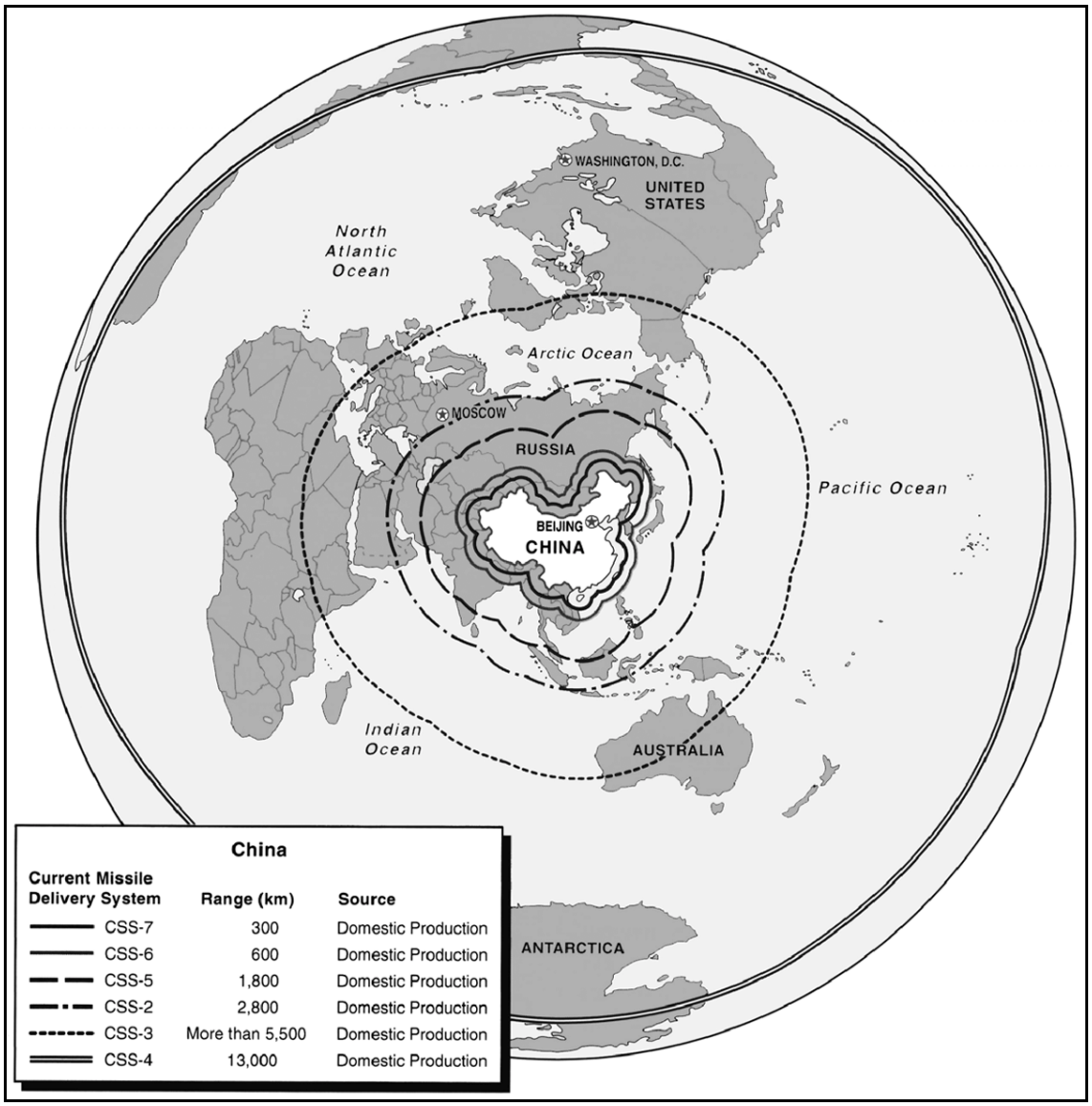

Figure 2-8. Ranges of Chinese Ballistic Missile Systems

2-41. China maintains a robust inventory of MLRs, with at least 18 different systems with ranges to 40 km. China's eagerness to export these weapons to other potential threat nations makes their use likely against US forces.

2-42. The Chinese are also active in CM development, basing this development primarily on the SS-N-2/Styx provided by the Soviets in the late 1950s. The HY-1/Silkworm and the HY-2 are the Chinese versions of the Russian Styx; they are limited in range and not considered high-tech systems. In the mid-1980s, China appeared to have reverse-engineered the French Exocet into the C-801 and has exported this system. Although China lacks an LACM capability, it may be developing a long-range spinoff of its ASCM programs.

2-43. The Chinese aerospace industry is actively developing new UAVs. In 1996 China displayed the ASN-206, designed to perform a variety of missions ranging from day and night aerial reconnaissance to battlefield surveillance. The ASN-206 is reportedly available for export.

INDIA

2-44. India will probably become self-sufficient in all areas of missile production in the near future. India has two missile programs: the Prithvi SRBM, with a range of 250 km and the Agni MRBM, with an approximate range of 2000 km, both of which could be used to deliver WMD/WME. India also has an ambitious space-launch vehicle program that could easily lead to ICBMs. The range capabilities of Indian missile systems are shown in Figure 2-9.

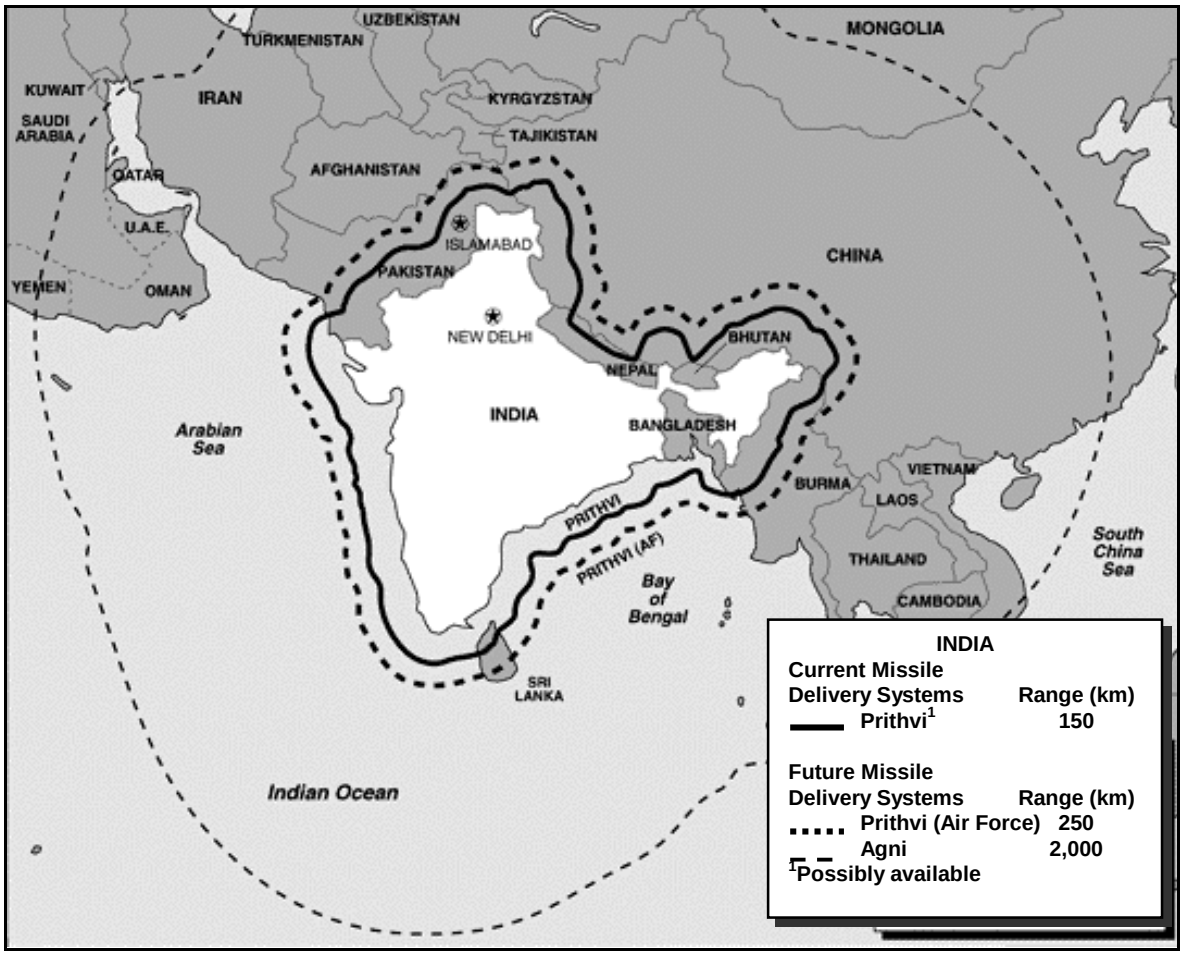

Figure 2-9. Ranges of Indian Ballistic Missile Systems

2-45. India has a variety of MLR, CM, and UAV development programs. India has developed a 45-km range, 214-mm MLR designed to "shoot and scoot," each launcher has its own computerized fire control system. Its ASCM inventory includes the French Exocet and the Russian Styx and Starbright. It

also developed the Lakshya, a LACM reportedly derived from a target drone. India currently has at least two indigenous UAV programs underway. It is also experimenting with a mini-UAV, similar to the Israeli Mazlat Pioneer system.

IRAN

2-46. Iran has placed a high priority on rebuilding its armed forces since its defeat in the Iran-Iraq War of 1988. Iran has emphasized the acquisition of power-projection capabilities, TMs, aircraft, and submarines to oppose intervention. This effort includes the development or acquisition of WMD/WME. Iran is attempting to build an indigenous capability to produce nuclear weapons, has had a biological warfare program since the early 1980s, and has produced large quantities of chemical agents since 1984.

2-47. Iran first acquired Scud B missiles from Libya and North Korea and used them during the Iran-Iraq War. Later, it received Scud B and C missiles from North Korea and CSS-8 missiles and components from China. It has launched a two-track missile program, acquiring Scud missiles and missile equipment from North Korea and establishing its own production capability. The range capabilities of Iranian BM systems are shown in Figure 2-10.

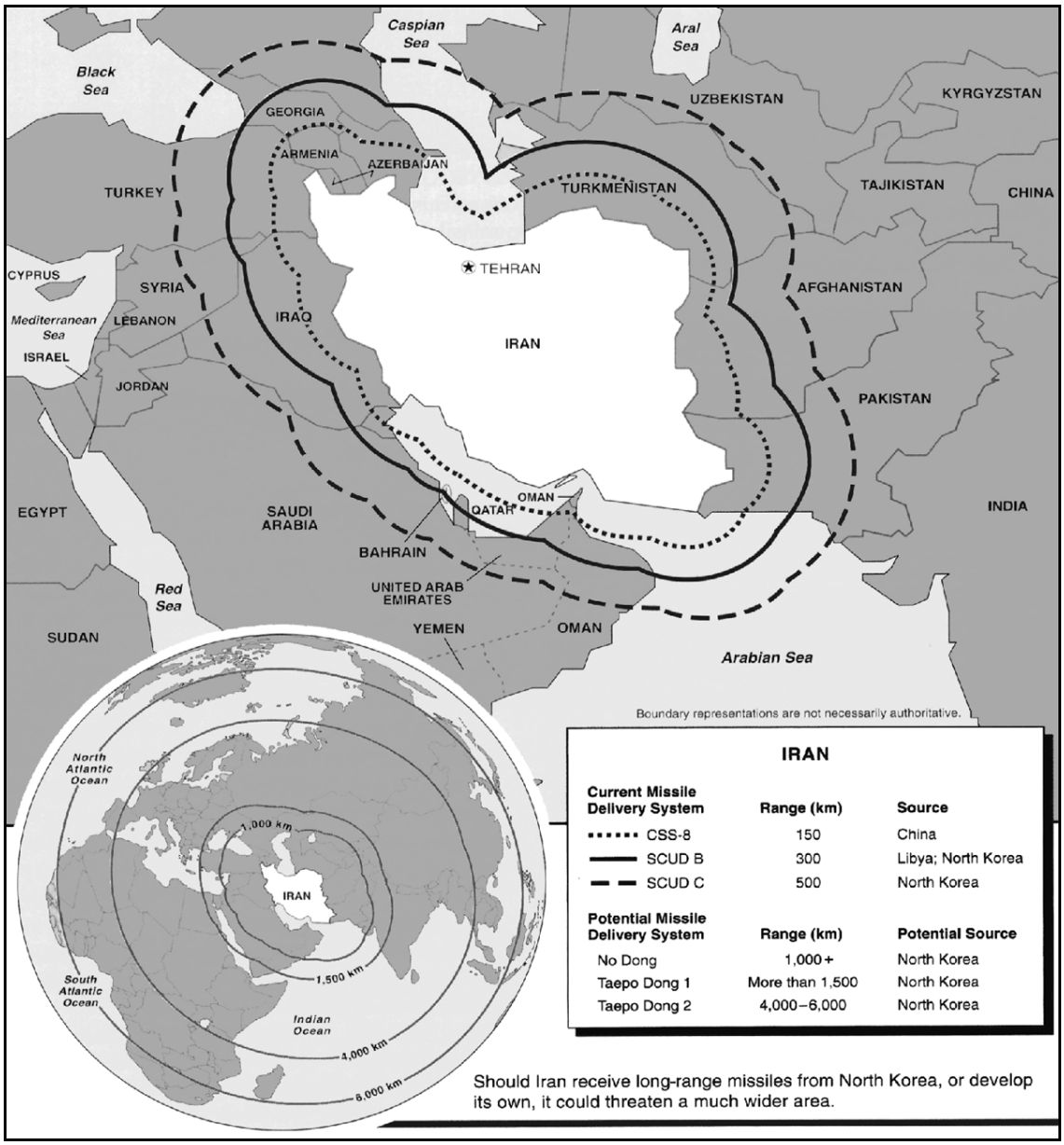

Figure 2-10. Ranges of Current and Future Iranian Ballistic Missile Systems

2-48. Iranian forces field a variety of LCRs and MLRs to support the Iranian Army and the Iranian Revolutionary Guard Corps. The LCRs, ranging in size up to 355.6 mm, are capable of delivering high explosives or, possibly, chemical weapons.

2-49. Iran has Chinese land-based and shipborne ASCMs and Russian ASMs. Iran is expected to continue to rely on China for ASCMs and, when available, LACMs.

2-50. Iran currently operates a limited UAV capability using the Sahahin, a radio-controlled battlefield reconnaissance drone, and the Baz, a radio-controlled reconnaissance drone with a reported attack capability. Iran operates several squadrons of UAVs, and there is concern that it may be developing the UAVs as a means of delivering chemical and biological agents.

IRAQ

2-51. Despite Iraq's defeat in the 1991 Gulf War, Saddam Hussein's goal is to establish Iraq as the leading Arab political and military power in the Middle East and to dominate the Persian Gulf. Iraq continues to seek the capability to employ WMD/WME. It has an extensive biological warfare program, has produced several thousand tons of chemical agents since the 1980s, and it continues to pursue a nuclear weapons production capability.

2-52. Iraq is believed to be hiding some quantity of TBMs, TELs, and other ground support equipment (GSE) and maintains some equipment needed to produce TBMs and rockets. Today, Iraq focuses its efforts on developing the Ababel 50, a Yugoslav-designed, 50-km range MLR, and the Ababel 100 SRBM. Iraq's artillery force includes rockets having a range of up to 100 km with submunitions dispensers, and the Layth-90 LCR, an Iraqi 90-km variant of the Russian FROG-7. The range capabilities of Iraqi BM systems are shown in Figure 2-11.

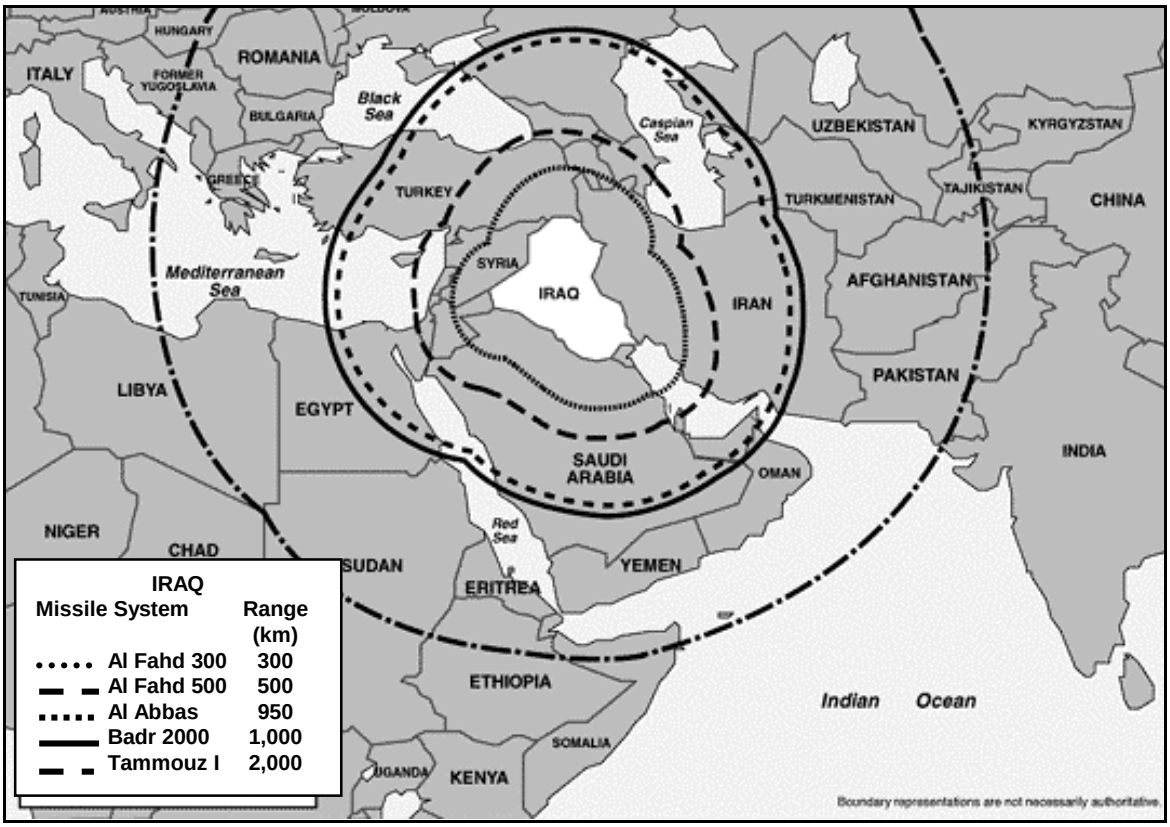

Figure 2-11. Ranges of Current and Future Iraqi Ballistic Missile Systems

2-53. Iraq effectively used an ASCM, the French Exocet missile, to damage the *USS Stark* in the Persian Gulf. The Iraqis have a limited number of C-601, C-801, Exocet, and HY-2 ASCMs in their inventory and are expected to acquire an LACM capability. Indigenous development programs have resulted in the Faw family of ASCMs, derived from the Russian Styx.

2-54. Prior to the Gulf War, Iraq had several developmental UAV programs. Today, there is no evidence of full-scale production, and it is assessed that only a few UAVs exist.

KAZAKSTAN

2-55. Kazakstan inherited an extensive inventory of TM systems from the FSU, but has no known chemical or biological warfare programs. While Kazakhstan's national policy supports US and UN-sponsored nonproliferation initiatives, serious concerns remain regarding their export policies and security measures. Kazakstan exports weapon systems, but it has a poor record of safeguarding weapons and nuclear material. Continued economic difficulties require massive infusions of hard currency that could be obtained through the sale of TM or WMD/WME systems or technologies.

LIBYA

2-56. Libya's TBM inventory is currently limited to the Scud B, but they have LCR, MLR, ASCM, and UAV capabilities. Libya is conducting both TBM and WMD/WME research and development (R&D). The development of an indigenous MRBM, or the acquisition of a foreign one such as the North Korean No Dong, would give Libya the capability to reach regional adversaries. They could target all of Egypt, much of Algeria, most of Israel, and portions of Europe including Athens and Rome. The Libyans have weapon stocks of chemical agents and are conducting low-level research on biological and nuclear weapons.

NORTH KOREA

2-57. North Korea has conducted extensive research, development, and production of TBM and WMD/WME systems over the last 10 years. They have developed, produced, fielded, and exported two Scud missile variants, the North Korean Scud B and Scud C, both capable of carrying WMD/WME. The fielding has provided North Korea with an extensive TBM infrastructure capable of launching hundreds of missiles deep into South Korea. The exports have included complete TBM systems consisting of missiles, TELs, and other GSE; disassembled electronic components for assembly by the receiving country; and production equipment. Countries in the Middle East, such as Iran and Syria, have received hundreds of these missiles.

2-58. North Korea is in the late stages of developing and fielding a new MRBM, the No Dong. Two additional new missile systems are in design and test, the Taepo Dong 1 MRBM and Taepo Dong 2 IRBM. Most recently, they have begun testing longer range multistage systems. The range capabilities of North Korean BM systems are shown in Figure 2-12.

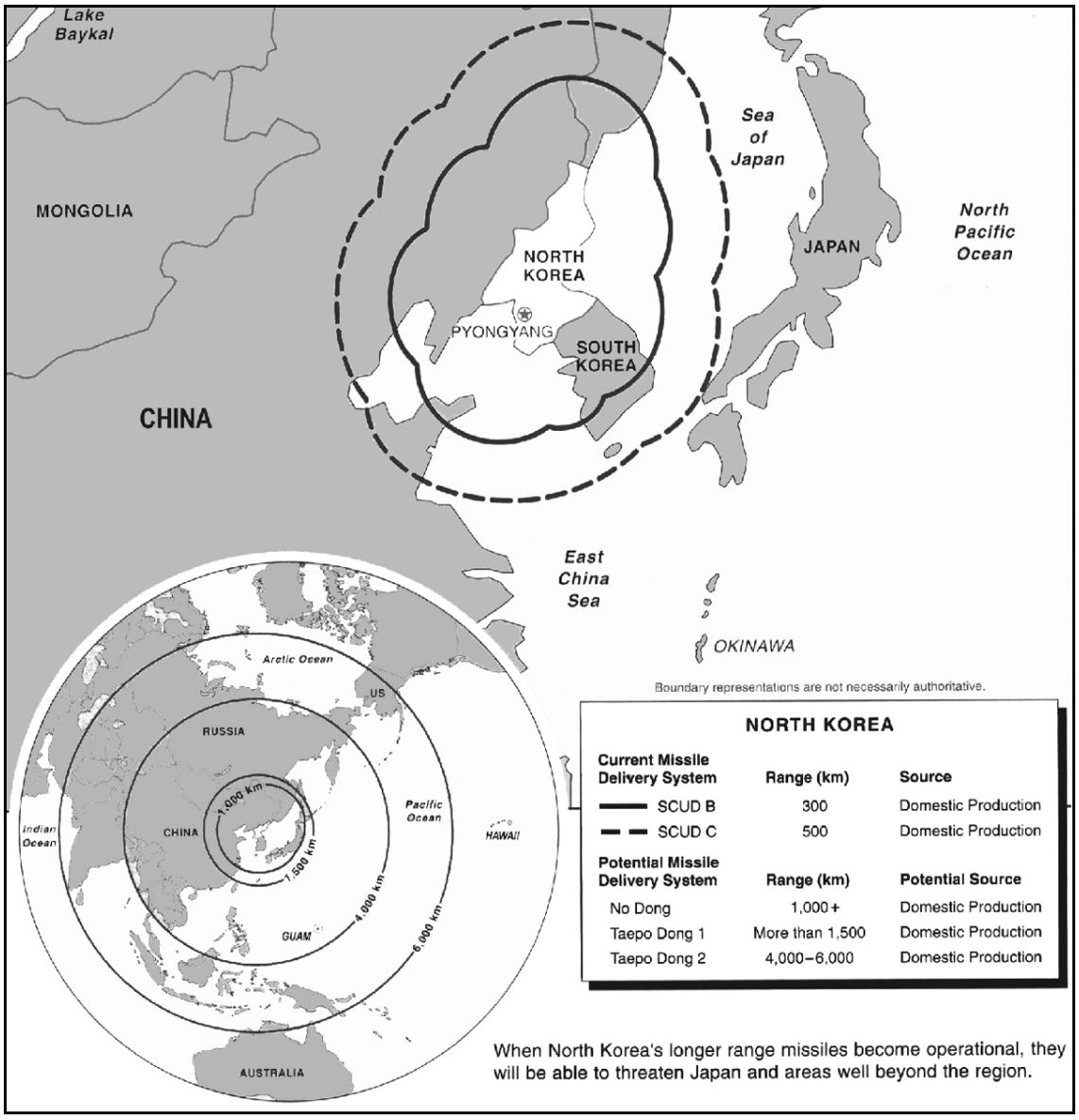

Figure 2-12. Ranges of Current and Future North Korean Ballistic Missile Systems

2-59. In addition, North Korea has produced more than 4,000 MLRs. These MLRs, based on Chinese systems, have ranges from 20 to 43 km. They produce two types of ASCMs based on the Russian Styx technology and the Chinese HY-1 and HY-2 missiles. However, it currently lacks a LACM capability. North Korea maintains a limited number of target drones, which might be used as decoys or attack systems.

PAKISTAN

2-60. Pakistan, like India, has both nuclear weapons and the TBMs capable of delivering them. Pakistan has purchased the M-11 SRBM from China and is

developing its own family of SRBMs, the Hatf I, II, and III. The Hatf I and II are based on French technology and are operational. Intelligence analysts believe the Hatf III, still in development, is based on the Chinese M-9 and M-11 technology.

2-61. Pakistan has a limited ASCM capability consisting primarily of Chinese Silkworm ASCMs. China is expected to remain Pakistan's most important supplier of missile-related technology.

RUSSIA

2-62. Russia is the primary recipient of the weapons inventories, production facilities, and technologies of the FSU. These resources include the largest stocks of TMs in the world. Russia's TBM inventory is limited to thousands of SS-1c/Scud B and SS-21/Scarab SRBMs as a result of the Intermediate Nuclear Force (INF) Treaty, which required the elimination of the FSU's extensive stocks of MRBMs. Russia possesses the bulk of the FSU's BM industrial base and remains capable of developing and producing the full range of solid and liquid propellant BMs and associated technologies. The SS-X-26 SRBM is in development, and is expected to be both a replacement for the SS-1c/Scud B and an export.

2-63. Russia maintains a large number of tactical and strategic nuclear weapons. It has the world's largest and most advanced chemical warfare program and has a considerable stockpile of nerve, blister, and choking agents. Russia may also be retaining its biological warfare production capability.

2-64. Russia's use of LCRs and MLRs can be traced to the Russian Katyusha system in World War II. Since then, the Russians have increased the range, caliber, accuracy, and variety of warheads for their rocket systems.

2-65. Russia began developing UAVs as early as 1950. The early systems were adaptations of obsolete full-size aircraft and large missiles. Newer systems, such as the Schmal, have been developed based on the successes of smaller, dedicated tactical UAVs in Chechnya.

2-66. Russia's national policy supports US and UN-sponsored nonproliferation initiatives. Nevertheless, serious concerns remain regarding Russian export policies and security measures. Russia continues to exhibit a vast array of weapons systems at international air shows, and it has exported an assortment of weapons to numerous countries. Continued economic difficulties require massive infusions of hard currency that could be obtained through the sale of TM or WMD/WME systems or technologies.

2-67. Russia has a poor record of safeguarding weapons and nuclear material. To date, thefts have focused primarily on small arms and military goods that are readily convertible to cash. Recent events have shown that nuclear material is available on the black market and within reach of potential terrorist countries. In addition, the emigration of Russian scientists, engineers, and technicians with experience in development of TM and WMD/WME technologies could provide other countries with access to critical research and production know-how, thereby accelerating their capabilities.

SYRIA

2-68. Syria acquired SS-1c/Scud B and SS-21/Scarab SRBMs from the FSU in the mid-1970s and the 1980s. Syria has received supplies of Scud-related equipment and materials from both North Korea and Iran. In parallel with the production program for the liquid propellant Scud, Syria (with foreign support) has devoted significant resources to establishing a solid propellant rocket motor development and production capability. Syria is laying the groundwork for a future option to develop a modern, solid propellant SRBM.

2-69. Syria may have chemical warheads available for a portion of its TBM force, enhancing this force's value as either a strategic deterrent or an actual weapon. In addition, Syria has a variety of Russian land and sea-launched short-range ASCMs and ASMs.

UKRAINE

2-70. Ukraine inherited an extensive inventory of TM systems from the FSU including SS-1c/Scud B and SS-21/Scarab SRBMs, but it has no known chemical or biological warfare programs. While Ukraine's national policy supports US and UN-sponsored nonproliferation initiatives, serious concerns remain regarding their export policies and security measures. Ukraine exports weapon systems, but it has a poor record of safeguarding weapons and nuclear material. Continued economic difficulties require massive infusions of hard currency that could be obtained through the sale of TM or WMD/WME systems or technologies.

TRANSNATIONAL THREAT

2-71. Transnational groups—including terrorists, insurgents, opposing factions in civil war, and members of organized criminal groups—are proliferating. Such groups are not generally bound by the same constraints or motivated by the same factors as nation states, and they pose significant threats to the interests of the US and its allies.

2-72. With numerous ongoing insurgencies and civil wars worldwide, there are additional dangers of escalation if NBC weapons or missiles are introduced. Opposing factions in civil wars, gaining access to TMs and WMD/WME, might threaten or actually use TMs with WMD/WME against civilian targets for either psychological or strategic effect; or they could use these weapons against conventional forces to disrupt staging or resupply efforts.

SUMMARY

2-73. The number of countries with the potential to present regional challenges to the US and its allies will increase as the capabilities of these countries increase. While traditional air threats such as fixed-wing aircraft and helicopters will continue to improve, the acquisition of new, lower-cost, unmanned threats—TBMs, CMs, ASMs, UAVs, and LCRs—adds greater lethality. TBMs, in addition to being effective terror weapons, will have a more significant military role as their range and accuracy improve. LCRs and MLRs with multiple warhead options and long-range, high rates of fire are

another deadly threat. CMs and ASMs are difficult to detect, highly accurate, and can attack from any direction. UAVs will add new attack, decoy, and targeting missions though still emphasizing the traditional reconnaissance mission. The use of WMD/WME is a likely condition of future warfare, and many of the unmanned threat platforms are capable of delivering such weapons. These emerging threats present a serious challenge to TMD.

2-74. Rogue countries such as Iran, Iraq, Libya, North Korea, and Syria continue to threaten global security and the stability of their respective regions. The tension between India and Pakistan exacerbated by recent nuclear testing by both countries is of serious concern. Belarus, China, Kazakstan, Russia, and the Ukraine have extensive inventories of TMs and access to either WMD/WME or WMD/WME technologies. They also have national needs that can be facilitated through weapon exports.

Chapter 3

The Army In Joint Theater Missile Defense

This chapter describes Army doctrine for TMD operations and how the Army contributes to the TMD fight within joint operations. The JFC is responsible for synchronizing the TMD capabilities of the individual components and supporting CINCs to neutralize or destroy enemy TM capabilities. Integration of TMD into the JFC's overall concept of operations and campaign objectives will ensure synchronization of all TMD capabilities and maximize force effectiveness.

GENERAL

3-1. Future combat operations are expected to be inherently joint in nature. Similarly, it must be anticipated that US Forces will inevitably fight as part of a coalition on a joint and combined team. Because of the Services' and coalition partners' capabilities, coordination and interoperability in the conduct of missile defense operations is essential. Command relationships in a joint theater are particularly important given the fast pace of missile defense operations and the need for cross-Service and allied coordination. Fusion of information and intelligence, focus on the missile defense fight, and the means to plan and rapidly execute missile defense for all pillars are crucial.

JOINT THEATER MISSILE DEFENSE ORGANIZATION

3-2. Generic responsibilities and command relationships are described in the following paragraphs. Commanders at every level will have specific roles and requirements for the conduct of joint TMD operations.

COMBATANT COMMANDER

3-3. The combatant commander establishes theater guidance and objectives for joint TMD and assigns and apportions forces and resources. The combatant commander's staff and component commanders' staffs plan, monitor, advise, coordinate, and execute overall operations, including joint TMD. The combatant commander is responsible for ensuring that joint TMD plans and operations of subordinate forces are integrated at theater level and documented in the appropriate operations plans and annexes.

JOINT FORCE COMMANDER

3-4. JFCs are combatant commanders, commanders of subordinate unified commands and Joint Task Forces (JTFs) authorized to exercise combatant command or operational control (OPCON) over a joint force (see JP 3-0, *Joint Operations*). The JFC establishes guidance and objectives for joint TMD. The

JFC defines and implements a methodology for joint TMD activities. The JFC issues planning priority guidance by phase for the defended asset list (DAL). The JFC, JFACC, or Area Air Defense Commander (AADC) (if delegated) tasks component headquarters to develop their detailed priorities of assets by phase. Once components provide their priorities by phase, the JFC, JFACC, or AADC, with component liaison officers (LNOs) go through an arbitration process to coalesce all priorities into a single DAL. The JFC's concept of operations specifies the objectives to be met and provides guidance for the employment of C^4I systems, attack operations, active defense operations, and passive defense measures.

JOINT FORCE COMMAND STAFF

3-5. The staff plans, monitors, advises, and coordinates the overall operation for the JFC. The staff develops and issues JFC-approved concept of operations, which includes joint TMD. The J2, J3, J4, J5, and J6 are the primary staff elements responsible for joint TMD operations at the joint force level (see JP 3-01.5). The Joint Targeting Coordination Board (JTCB) (if established) and the political advisor also support joint TMD operations. The responsibilities of the elements are determined by the JFC.

AREA AIR DEFENSE COMMANDER

3-6. The JFC will normally assign overall responsibility for defensive counter air (DCA) to an AADC. When a JFACC is designated, the JFACC will normally be assigned to function as the AADC. The AADC develops a joint force estimate of friendly active defense capabilities to facilitate planning. The AADC develops and executes plans for dissemination of launch warning to all component levels, multinational forces, and civil authorities. The AADC develops and executes plans to disseminate launch warning and cueing information by the fastest means available to service components and active defense forces for engagement operations. The AADC develops and executes the plan for joint TMD active defense operations, including weapons control procedures and measures (see JP 3-01.5). The AADC ensures that optimum effectiveness is realized from each of the weapon systems used for active defense and that no unnecessary restrictions are placed upon their employment.

JOINT FORCE AIR COMPONENT COMMANDER

3-7. The JFC will normally assign responsibility for the planning and execution of joint TMD attack operations outside the service component commanders' operational areas to the JFACC. Since the location of these operational areas may change, the JFACC should also plan for and maintain visibility on the theater/Joint Operations Area (JOA) wide attack operations effort. This will ensure the JFACC is prepared to support the other component commanders, when they request JFACC support in conducting joint TMD attack operations within their operational areas. The JFACC will normally be assigned to function as the AADC and airspace control authority (ACA**)** since these functions are interrelated.

AIRSPACE CONTROL AUTHORITY

3-8. The ACA coordinates and integrates the use of theater airspace. Airspace control is vital to active air defense operations involving TM carriers and CMs. Establishment of identification/classification procedures assists units that conduct active air defense to identify targets and prevent engagement of friendly air and missile assets. Usually, one individual will be assigned the responsibilities of the JFACC, AADC, and the ACA. If this is not the case, close coordination between the three is essential. The ACA develops broad policies and procedures for airspace control and for coordination among units within the operational area (see JP 3-52 for detailed information on the ACA).

ARMY THEATER MISSILE DEFENSE ORGANIZATION

3-9. ARFOR are assigned to the CINC to conduct sustained land operations. The ARFOR Commander plans and executes joint TMD operations as directed by the JFC, and he executes active defense, in accordance with weapon control procedures and measures established by the AADC, as approved by the JFC. The ARFOR Commander retains OPCON of his forces for joint TMD.

3-10. The ARFOR Commander plans and executes combat operations and jointly coordinates and prioritizes his operations and needs with the JFC and with other component commanders. Inside his operational area, the ARFOR Commander is normally designated as supported commander for attack operations. The ARFOR Commander, as are all component commanders, is responsible for providing warning to assigned and attached forces. Close coordination among component commanders, the JFC, and the AADC is necessary to achieve effective joint TMD operations. Within the ARFOR, the AAMDC is responsible for this coordination.

ARMY AIR AND MISSILE DEFENSE COMMAND

3-11. The AAMDC is the Army organization that performs critical theater level air and missile defense planning integration, coordination, and execution functions for the ARFOR Commander and JFLCC. The AAMDC integrates the four operational elements of TMD: active defense, attack operations, passive defense, and C^4I to protect contingency, forward deployed, and reinforcing forces as well as designated theater strategic assets. The AAMDC prepares the air and missile defense annex for the ARFOR operations order (OPORD). The AAMDC commands the echelons above corps (EACs) ADA brigades and other assigned forces. Figure 3-1 (see page 3-4) provides a functional comparison between the AAMDC and an ADA Brigade Headquarters.

AAMDC	EAC ADA BDE HQ
• C^2 Headquarters tailored for joint operations	• C^2 Headquarters tailored for Army component operations
• Performs theater-level TAMD planning, coordination, and synchronization	• Executes tactical-level engagement and force operations
• Conducts Four Pillars of TAMD	• Primarily conducts active and passive defense
• Commands EAC ADA BDEs and provides TAAMDCOORD and Deputy AADC	• Commands Air Defense Battalions
• LNO capability to link with key C^2 nodes throughout the theater	• No LNO capability
• No organic signal capability	• Organic signal capability
• Limited logistic readiness center capability	• Logistic readiness center capability

Figure 3-1. Functional Comparison

3-12. The AAMDC provides the staff and equipment to plan, coordinate, deconflict, and monitor the execution of the ARFOR Commander's (or JFLCC's if designated) air defense and TMD plans during force projection operations. The AAMDC consists of intelligence, fire support, aviation, chemical, ADA, Special Forces, and signal personnel melded into an effective TMD team. The AAMDC focuses on TMD operations for the ARFOR Commander (or JFLCC if designated) and is continuously collecting intelligence, analyzing information, and coordinating missions across all TMD operational elements. For example, the AAMDC coordinates with the ARFOR G2, G3, and DOCC to recommend prioritized TMD targets. In addition, AAMDC LNOs deploy to all major theater elements: JFC, JFACC/AADC, JFLCC, Joint Force Maritime Component Commander (JFMCC), Joint Special Operations Task Force (JSOTF), Battlefield Coordination Detachment (BCD), DOCC, ACE, and multinational headquarters to provide coordination and deconfliction for the execution of integrated air defense and TMD operations.

3-13. When the AAMDC is deployed to a theater of operations, the commander will perform the functions of Theater Army Air and Missile Defense Coordinator (TAAMDCOORD) and Deputy Area Air Defense Commander (DAADC) as required. The TAAMDCOORD is the Army Air and Missile Defense Coordinator (AMDCOORD) to the ARFOR Commander (or JFLCC if designated), JFACC, and AADC. The TAAMDCOORD, as a special staff officer to the ARFOR Commander (or JFLCC if designated), ensures Army air and missile defense is integrated with active air defense operations and planning at the theater level. This will include integration with joint and multinational active air defense and TMD participants. The TAAMDCOORD also ensures that corps air and missile defense requirements are integrated into active air defense and TMD planning. The functions of the DAADC are:

- Integrate Army TMD active defense and ADA forces with joint active air defense operations.

- Advise the AADC regarding weapons control procedures and measures, air defense warnings (ADW), and emission control (EMCON) measures.
- Assist the AADC in the air defense plan development.
- Advise the AADC on matters regarding active missile defense operations and ensure integration into active air defense plan.
- Advise the AADC on TMD operations and integrate active defense planning.
- Advise the AADC on ADA weapons capabilities and limitations.

ARMY FORCES THEATER AIR AND MISSILE DEFENSE CELL/AIR DEFENSE ELEMENT

3-14. The ARFOR TAMD Cell/Air Defense Element (ADE) is a staff element that works for the ARFOR G3. The TAMD Cell/ADE performs TAMD staff work on a daily basis. During contingency operations the TAMD Cell/ADE plans and coordinates TAMD operations for the ARFOR and prepares for the reception of the AAMDC into theater. Once deployed, the AAMDC assumes the functions of the ARFOR TAMD Cell, and the TAMD Cell serves as the AAMDC's liaison to the ARFOR Commander.

BATTLEFIELD COORDINATION DETACHMENT

3-15. The BCD is the ARFOR liaison to the service component commander designated as the JFACC and is co-located with the Joint Air Operations Center (JAOC). The BCD is organized in seven sections: headquarters, operations, plans, intelligence, ADA, airspace management, and airlift. The BCD processes Army requests for tactical air support, monitors and interprets the land battle situation for the JFACC staff, and provides the necessary interface for exchange of current intelligence and operational data. The BCD eases planning, coordination, and execution of the following functions: battle command, intelligence, fires, airspace management, air defense, command and control warfare (C^2W), airlift support, and TMD. In order to integrate the TAMD battle, the BCD supports the ARFOR TAMD Cell/ADE responsible for TAMD in theater. The ARFOR Commander specifies the role of the BCD to help in coordination of TMD active defense and attack operations with the JAOC. Once the AAMDC deploys to theater, it will assume the functions of the ARFOR TAMD Cell, and the BCD will support the AAMDC in TAMD (see FM 100-13 for detailed information on BCD operations).

DEEP OPERATIONS COORDINATION CELL

3-16. The DOCC is a C^2 node that plans, prepares, and executes Army deep operations. The DOCC brings together those staff elements within the C^2 structure normally associated with deep operations. The DOCC assists the commander in processing and cataloguing of information so he can best allocate his assets to win both close and deep operations. These functions are performed simultaneously and continuously throughout the conduct of operations. The DOCC provides a streamlined, automated process to employ the decide, detect, deliver, and assess (D^3A) methodology for deep operations. Typically, when the ARFOR staff identifies operational high payoff targets

(HPT), it will coordinate with subordinate units for acquisition and attack by systems allocated or organic to the corps (see FM 100-7).

ANALYSIS AND CONTROL ELEMENT

3-17. The ACE, located at various command centers, receives intelligence data from multiple sources, fuses and analyzes the data, produces targeting and situational intelligence, and provides collection management. The ACE conducts an analysis and laydown of the TM threat. AAMDC LNOs participate in the analysis and lay down of the TM threat and conduct continuous coordination with the ACE. Elements of interest include order of battle, number and type weapon systems and their capabilities and limitations, tactics for employment, and general political situation. The ACE identifies the location of TM production and support facilities and TM infrastructure. Terrain delimitation analysis reduces the area required for sensor search and the number of possible engagement areas. The Deployable Intelligence Support Element (DISE) is the early entry portion of the ACE. The military intelligence (MI) unit commander and the ARFOR G2 determine its size and composition.

JOINT TACTICAL GROUND STATION

3-18. The Joint Tactical Ground Station (JTAGS) is a transportable, mobile, in-theater element of US Space Command's (USSPACECOM's) Theater Event System (TES). JTAGS performs near real-time tactical event reporting of TBMs and other IR events by using the direct-downlinked data from the Defense Support Program (DSP) sensors. JTAGS uses a variety of voice and data warning networks to report estimated launch point coordinates, predicted ground impact coordinates, and state vectors in support of the theater CINC. JTAGS use of in-theater networks and Tactical Information Broadcast Service (TIBS)/Tactical Data Distribution System (TDDS) broadcasts supports AAMDC and ARFOR TMD operations. USSPACECOM's concept of operations for C^2 of Space Forces furnishes the structure of command relationships and facilitates the full integration of JTAGS into joint and combined operations to maximize its support of the warfighter. USCINCSPACE, as supporting CINC to combatant (theater) CINCs, has combatant command (COCOM) of JTAGS while the ARSPACE commander has OPCON.

ARMY THEATER MISSILE DEFENSE OPERATIONS

3-19. The AAMDC executes Army TMD operations through its Air and Missile Defense Planning and Control System (AMDPCS), which is the main component of the AAMDC tactical operations center (TOC). All staff sections operate the AMDPCS. Successful TMD operations are dependent on the simultaneous and sequential execution of a wide spectrum of tasks and activities. Some of these tasks begin prior to the use of military force, such as planning, IPB, and training.

3-20. IPB drives the development of a collection plan, which includes specific named areas of interest (NAI), and identifies which sensors will cover the NAI during designated time periods. Sensor surveillance at the required time

against specific TM targets in specific areas is critical to successful conduct of TMD operations.

3-21. During planning, forces are task organized, TM targets are prioritized, and ROE are established to protect the force and provide freedom of maneuver for friendly forces. Passive defense, active defense, and attack operations are planned and C^4I requirements are developed.

3-22. Commanders at all levels allocate the proper TMD resources to meet the threat. The ARFOR will sequence units supporting the joint TMD plan in the force deployment and employment schedules so that a joint TMD capability can be established consistent with the overall JFC priorities and risk assessment. Since joint TMD assets are limited, especially during entry operations, commanders must place special emphasis on providing security against terrorist and similar threats.

3-23. While some aspects of TMD operations begin prior to entry, the full range of TMD operations may be needed immediately upon arrival in theaters with a TM threat. Upon arrival all units take precautionary passive defense measures. The ARFOR may conduct proactive attack operations, particularly in counter RSTA operations to preclude observation by enemy sensors. When a launch is observed, the C^4I system passes launch warning to subordinate commands to initiate additional passive defense measures. Additionally, the C^4I system passes launch point, trajectory data, and impact point and time data to active defense and attack operations units.

3-24. Well-rehearsed TMD plans permit forces to fight effectively in a TM environment. Passive defense measures are implemented throughout the entire force. Selected units conduct active defense and attack operations. C^4I is an essential component of all TMD operations because C^4I is the foundation to conduct and link all operational elements of TMD. Integrated training with joint and multinational forces prepares the Army to operate as part of the joint and multinational team.

PLANNING

3-25. Planning begins with receipt of a mission statement and planning guidance from the JFC. The ARFOR Commander receives staff estimates of the situation, and ARFOR TMD priorities are established. Concurrently, a detailed IPB of TM activity and infrastructure is conducted, and courses of action are developed and analyzed by the AAMDC and ARFOR staff. The end result is a phased air and missile defense annex to the ARFOR plan. To ensure complementary effort and to achieve maximum effectiveness, TMD planning should be integrated in the AADC's theater air defense plan and continually coordinated among all joint force components. Coordination of TMD plans with multinational forces and civil authorities should also be considered throughout planning and operations phases.

3-26. Within the ARFOR, the G2, G3, G4, signal officer (SIGO), TAAMDCOORD, military police, engineer, and chemical officers are key participants in the planning process. These staff officers perform their traditional staff functions of intelligence, operations, logistics, communications, air and missile defense, security, route planning, survivability, mobility, and the NBC defense, respectively. However, each

must incorporate TMD into their respective areas of staff responsibility. The AAMDC Commander as the TAAMDCOORD will coordinate and deconflict TMD planning throughout the ARFOR staff and subordinate commands and ensure Army TMD operations are integrated with those of the joint force. The AAMDC provides the specialized personnel, training, and equipment to plan, coordinate, deconflict, and monitor the execution of ARFOR TMD operations across all four operational elements.

Passive Defense

3-27. Warning, deception, and operational security (OPSEC) plans are the key components for the passive defense effort. Planning for passive defense is conducted at all levels. Planning should include tactical warning, reduction of the enemy's targeting effectiveness, reduction of force vulnerability to TM attack, and reconstitution. Countermeasures to be taken at each level of command are established. Battle damage caused by TM attacks is reported through the C^4I system. In addition to those actions taken by all units, MI, ADA, engineer, CSS, chemical, medical, and signal units provide specific contributions to passive defense.

Active Defense

3-28. The AAMDC and ARFOR staffs conduct planning for active defense. Intelligence requirements are identified and collection management priorities are established for TM detection, acquisition, classification, discrimination, and identification. The C^4I architecture is designed to meet the needs of fire units and C^2 nodes for integrated near real-time TM track data from national, theater, and Army sensors. Threat priorities and identification procedures are established by the AADC for engaging both TMs and aircraft suspected of carrying TMs. The Army normally plays an active role in developing the joint priorities and ROE. The AAMDC Commander, if designated the DAADC, assists the AADC in developing the air defense plan for the theater. In developing joint priorities and ROE, the Army normally recommends straightforward ROE for ASMs and TBMs to allow ADA units to engage these targets based on classification, not identification. ROE for CMs must be synchronized with air defense ROE due to the commonality with aircraft flight characteristics. As technology enables accurate target classification as manned or unmanned, future doctrine and established ROE may allow for the authority to engage on classification as an unmanned platform. Such a procedure will allow preferential engagement of cruise missiles and UAVs; destroying them at ranges and locations that minimize lethal effects on friendly forces. The JFC, with input from the component services, establishes joint TMD priorities based on the campaign plan. The AAMDC Commander provides mission analysis and courses of action to defend the JFC's priorities based on criticality, vulnerability, recuperability, and threat (CVRT). Factors of METT-TC must be considered as a part of this analysis. The AAMDC Commander designates ADA forces to protect forces and selected assets, and initial defense designs are developed to counter the threat. Sharing of selected ADA engagement data with the C^4I system for passive defense and attack operations is planned to supplement other sources. ADA engagement data frequently is the best data available to support passive defense warning and, as such, may become the primary data source.

3-29. A mix of complementary active defense systems must be employed to effectively counter the TM threat to rear areas during early entry and follow-on operations. This mix will consist of an upper tier system and one or more lower tier systems. The upper tier system counters the longer range TBMs that are beyond or are more stressing to the engagement capabilities of the lower tier systems. The upper tier TBM defense system extends the battlespace to permit multiple engagements at longer ranges. Operating together, the upper and lower tier systems provide for a greater degree of asset protection by enabling a leak-proof or near leak-proof defense.

3-30. Lower tier systems must have sufficient mobility and tactical deployability to be capable of protecting maneuver forces and assets in the corps and division areas from short-range TBMs, CMs, and ASMs. They must also be able to counter aerial ISR and CM launch platforms.

3-31. Active defense operations defend only what is most important or critical due to resource limitations. The ARFOR Commander coordinates with the JFC to ensure the availability of active defense resources is considered when establishing priorities. He further coordinates to ensure that the ARFOR area of operations is supportive of active defense operations.

Attack Operations

3-32. Component commanders plan attack operations based on the assignment of attack responsibilities and the JFC's concept and priorities. The apportionment decision of the JFC also influences attack operations planning. During planning, decisions are made concerning targets, criteria for attack, sensor assignment for ISR, joint suppression of enemy air defense (JSEAD), and attack assets. Targeting by the ARFOR at the operational level is focused on planning and coordination.

3-33. Typically, when the ARFOR staff identifies high-payoff operational targets, it will coordinate with subordinate units for acquisition and attack by systems allocated or assigned to the ARFOR. There will be some HPTs that subordinate units are not capable of engaging. The critical nature of these targets—and the requirement to coordinate and synchronize the employment of several joint acquisitions/attacks as quickly as possible—requires the ARFOR to establish the DOCC at EAC, or at Corps when assigned as the ARFOR, to accomplish the targeting effort.

3-34. Joint TMD targets include enemy TMs; launchers; command, control, and communications (C^3); RSTA; TM-capable airfields; and logistics elements. The decision to attack TMs is based on the JFC's and component commander's priorities and is facilitated by the ROE. Accurate targeting data is required for execution. ROE or a trigger event established during the planning process would initiate the attack operations. BDA is planned as an integral part of the attack operations D^3A process. Sensor availability for BDA and surveillance tasks must be coordinated and deconflicted.

3-35. Since the ARFOR Commander is the supported commander for attack operations within his operational area, the commander normally establishes permissive fire control measures to enable the JFACC to support Army attack operations requests. Requests for JFACC attack operations support are sent to the JFACC through the BCD.

3-36. The ARFOR Commander coordinates with the JFC to ensure that the Army operational area boundary is designed to maximize Army maneuver and fire support attack operations capabilities. The operational area should be large enough for commanders to accomplish their missions and protect their forces.

Command, Control, Communications, Computers, and Intelligence

3-37. C^4I planning considerations should include resources available during the various phases of Army operations. C^4I planning must anticipate Army, joint, and multinational needs for near real-time responses to the TM threat, the wide range of appropriate TMD operations, the diverse nature of TMD elements, and the possible impact of TMD on other missions and tasks. The C^4I system supports BDA for friendly operations and enemy actions. The C^4I architecture (nodes and communications) must be robust and redundant to enable the commander to always have several executable options (see Appendix C).

EXECUTION

3-38. Though discussed sequentially, the four elements of TMD are executed simultaneously. The echelon level of execution is dependent on the measure being implemented.

3-39. The AAMDC monitors the execution of passive defense, active defense, and attack operations. In some situations, the AAMDC recommends the implementation of Army TMD measures especially in the areas of attack operations and passive defense. The AAMDC provides the early warning and alerting of TM predicted impact and launch information for the ARFOR.

Passive Defense

3-40. Component commanders receive tactical warning from the joint C^4I architecture and provide warning to assigned forces. Tactical warning triggers passive defense actions. Warnings are both general (that missile launches are imminent or have occurred) and specific (that specific units or areas are in danger of attack). The warning system is prescribed by the JFC.

3-41. Executing passive defense is the responsibility of unit commanders at all levels. Commanders reduce enemy targeting effectiveness through the use of OPSEC measures, deception, and mobility. Commanders reduce their own vulnerability to TM attack by hardening, redundancy and robustness, dispersal, and NBC defense. ARFOR may also be employed to train civilian authorities in passive defense measures. Following a TM attack, units should be reconstituted to a desired level of combat effectiveness. BDA reports are forwarded through the C^4I system.

Active Defense

3-42. Active defense operations are centrally controlled (see FM 44-100), but decentrally executed. Initial warning reports can be used to alert ADA units. Specific warning reports (surveillance track data) cue ADA units. ADA units engage TMs to protect the force and selected geopolitical assets. Task

organization and defense design support the concept of operations and counter the threat.

3-43. Capabilities dictate that ADA units engage enemy TBMs and ASMs based on classification as the means for identification. CMs and aircraft carrying ASMs must be engaged in accordance with JFC-approved ROE established by the AADC. ADA units are deployed in depth to present an ever-increasing volume of fire as enemy TMs ingress.

Attack Operations

3-44. When ARFOR resources are not sufficient to attack acquired TM targets, the ARFOR requests joint air support through the BCD. The BCD will then process the request with the appropriate Service command cell to conduct the attack.

3-45. Execution of attack operations is centrally controlled and decentrally executed. At the tactical level, responsive intelligence and operations interfaces are required for targeting TM launches and infrastructure. After detection, acquisition, and identification of TM targets, subordinate commanders execute attack operations. Observed enemy activity triggers timely execution, which has been anticipated through the D^3A process. Preemptive strikes may be conducted at the onset of hostilities if included in the JFC's plan. Attacking enemy TM capabilities as early as possible prevents the launch of a substantial number of TMs. C^2W is employed against an enemy's C^3 and RSTA to disrupt TM operations. Support facilities are also attacked. Sensors are tasked to provide BDA through the C^4I system.

Command, Control, Communications, Computers, and Intelligence

3-46. C^4I system must rapidly disseminate intelligence to subordinate commands and support attack operations and active defense with a near real-time targeting capability. C^4I for Army TMD must be integrated into the overall theater and Army C^4I architecture. The C^4I system uses BDA reports to refine the IPB. The refined IPB may lead to changes in priorities, guidance, and the TMD concept of operations (see Appendix A).

MULTINATIONAL THEATER MISSILE DEFENSE OPERATIONS

3-47. JP 3-01.5 states TMD operations may be required within the context of an alliance, coalition, or other international arrangement. Requirements, responsibilities, and organizational considerations for conducting TMD in a multinational operations environment are similar to joint operations. However, special considerations and areas of emphasis are needed to ensure unity of effort with other national forces. Differences in doctrine, training, equipment, and organization should be identified and considered when determining multinational interoperability requirements for employing forces. When national forces of the multinational force are not uniformly capable of actively defending against threat TMs or attacking threat TM targets, provisions should be made to ensure TMD assets are provided for missile defense within multinational CINC-established priorities. Consensus on the TM threat, a clearly defined chain of command, and a responsive, interoperable C^2 structure are crucial to successful multinational TMD

operations. Consideration may also be given to assisting civil authorities in establishing passive defense measures for the civilian population and assets consistent with the overall mission (see FM 100-8, *Multinational Operations* for more detailed information concerning multinational TMD operations).

Chapter 4

Command and Control

This chapter describes C4I aspects of the Army TMD mission. It discusses C4I planning and execution of Army TMD operations against a backdrop of force projection operation stages.

GENERAL

4-1. C4I for joint TMD missions must be accomplished effectively using joint and Army C4I systems and resources to ensure integration with other operational functions and to optimize the use of scarce resources. C4I links passive defense, active defense, and attack operations to provide timely assessment of the threat; rapid dissemination of general and specific warning; and mission assignment, targeting data, and BDA to appropriate joint TMD elements. For each operational element, the C4I system must provide rapid communications among intelligence assets, aid data fusion and decision making, and provide early and alert warning. It also provides commanders, staffs, and supporting commanders with the means of rapid coordination. Space assets are critical to joint TMD operations because they provide TBM launch warning, launch point prediction, TM type determination, impact point prediction, weapon systems cueing, communications, and related intelligence (see FM 100-18, *Space Operations* for details). Joint TMD C4I capabilities support distributed planning at all levels, decentralized execution, and the coordination of assigned forces' efforts.

4-2. TMD operations are complex. The limited time available for execution of TMD operations places great demands on C4I systems. Commanders and staffs integrate the capabilities of Army TMD operations with joint passive defense, attack operations, active defense, and C4I within the overall operation to obtain the maximum effectiveness in countering enemy TMs, thereby maximizing the flexibility of warfighters to conduct operations.

COMMAND AND CONTROL

4-3. C2 for Army TMD operations is the exercise of authority and direction by commanders over their subordinate forces participating in TMD operations. Army TMD C2 involves all functional processes related to the planning and execution of the Army TMD mission. Battle command is the art of battle decision making, leading, and motivating soldiers and their organizations into action to accomplish missions. It includes visualizing the current and future states, then formulating concept of operations to achieve decisive victory. Control is the science of implementing the commander's guidance and intent by determining requirements, allocating resources, measuring performance, and recommending adjustments and refinements. Army TMD

C^2 operates within existing C^2 structures of units having Army TMD missions at all levels to ensure the seamless and timely flow of Army TMD information.

COMMUNICATIONS

4-4. Communications involves receiving and distributing Army TMD information required by the C^2 functions. Communications includes communications architectures, protocols, data and voice communications, relay devices, input/output data terminals, and data links. The communications aspect of TMD C^4I provides the technical capability for Army TMD integration.

COMPUTERS

4-5. Automation exists throughout Army TMD C^4I to enhance performance and promote standardization, commonality, and modularity. TMD C^4I maximizes use of existing and planned automation in the form of common reconfigurable workstations and software modules to tailor the information processing software (automated decision aids) for a particular function, application, or situation. Information will be replicated, distributed, and integrated as applicable throughout the joint TMD C^4I network. Computers support the rapid fusion of data to meet the short Army TMD execution timelines.

INTELLIGENCE

4-6. Intelligence is vital to the joint/Army TMD decision-making cycles and must support friendly TMD assessment, planning, warning, and IPB functions as well as engagement decisions and target prioritization of enemy TM systems. The intelligence function focuses on acquiring and making information available to support joint/Army TMD operations using intelligence systems, capabilities, and organizations within the C^4I operational elements.

COMMAND, CONTROL, COMMUNICATIONS, COMPUTERS, AND INTELLIGENCE ORGANIZATION

4-7. Theater-level units consist of organizations and activities of large, relatively immobile facilities and require extensive dependable road and communications networks. Organizations and activities at EAC may be more vulnerable to TM attack than mobile, armored, dispersed maneuver forces in the corps area. The ASCC/ARFOR Commander exercises those operational missions assigned by the JFC. If the JFC does not designate a JFLCC, the ASCC may designate an ARFOR Commander to retain OPCON of the ARFOR.

COMMAND AND CONTROL

4-8. Army TMD C^2 in units at EAC is closely tied to joint and multinational forces. The ARFOR Commander receives all missions and guidance, to include those related to Army TMD operations, from the JFC or JFLCC and

staff. Coordination is accomplished with other service components, host nations, and multinational forces.

Army TMD Integration

4-9. The AAMDC commander, as the TAAMDCOORD, integrates all four operational elements of TMD for the ARFOR. As the ARFOR's TAMD coordinator, the AAMDC Commander must also coordinate closely with the JFC, AADC, Air Operations Center (AOC), and Anti-Air Warfare Commander (AAWC), when deployed. The AAMDC is equipped with a variety of communications, computer, and intelligence capabilities within its TOC (AMDPCS) to support the TAAMDCOORD and accomplish the TMD mission.

Attack Operations

4-10. The JFC establishes theater guidance and objectives for joint/Army TMD and assigns and/or apportions forces and resources. The component commanders jointly conduct operations under the guidance and in support of the objectives of the JFC. Component commanders are responsible for planning and executing combat operations and for jointly coordinating and prioritizing their operations and needs with the JFC and other component commanders. The ARFOR Commander has various means with which to execute Army TMD attack operations. He may employ long-range rockets, missiles, or attack helicopters; or he may coordinate the use of air and sea power with Army resources.

4-11. At the operational level, the focus of the targeting effort is more on planning and coordination than on execution. There will be some critical targets, such as enemy TMs and TM infrastructure, that subordinate Army units are not capable of acquiring or engaging. The nature of these targets—and the requirement to coordinate and synchronize the employment of several joint acquisitions/attacks as quickly as possible—may require the ARFOR Commander to establish a DOCC at EAC to support the targeting effort.

4-12. The AAMDC provides target nominations to the DOCC for TM targets. Depending on the target and target location, the DOCC may decide to strike the target, request immediate air support, or insert the target in the air tasking order (ATO).

Active Defense

4-13. The AAMDC commands and controls all EAC ADA brigades assigned in theater. It provides force protection and designated priority asset air defense and active defense for the JFC's DAL. In addition, the AAMDC commander accomplishes the duties and responsibilities of the TAAMDCOORD and, if appointed, the DAADC. The TAAMDCOORD is a member of the ARFOR Commander's special staff for planning, coordinating and executing air defense and missile defense at the numbered Army level. As commander of EAC ADA forces, the AAMDC is responsible for ensuring that these forces are integrated into the AADC's theater-wide air defense plans and priorities.

Passive Defense

4-14. TM warning is planned for units conducting operations at the operational or tactical level. The AAMDC develops and provides the ARFOR Commander with a TM warning architecture including detection, communications nodes, warning notification, and dissemination procedures for the ARFOR. Although warning is a component responsibility, the ARFOR Commander may be given the mission to supplement or provide theater warning to the other components, multinational forces, and civil authorities. All unit commanders plan, prepare, train for, and execute TMD passive defense measures to minimize the impact of TM attacks.

COMMUNICATIONS

4-15. Communications at EAC are established and maintained using all available strategic, operational, tactical, and commercial resources to support TMD operations. See Appendix C for a detailed description of communication systems.

INTELLIGENCE

4-16. An assigned MI brigade supports intelligence activities at EAC. This brigade is task organized, based on mission requirements to provide C^2 for a number of specific MI battalions and provides support for G2 and ACE operations.

4-17. The ACE provides Army TMD intelligence data to the AAMDC, while the AAMDC provides focused TM analysis and intelligence back to the ACE. The ACE requests or tasks intelligence collection missions, intelligence data from other intelligence collection agencies, and ensures existing intelligence data is loaded on the All Source Analysis System (ASAS) and distributed to other C^2 nodes that have the capability to receive this data.

4-18. Intelligence support within the AAMDC is composed of an analysis cell with an attack operations team for target nominations and analysis and an operations cell for situation development, terrain analysis, and advice on requests for information and directed collection. Together these cells perform the intelligence functions of indications and warning, IPB, situation development, target development and nominations, and BDA with regard to Army TMD. The AAMDC links with the ACE and the EAC MI brigade for the processes of collection management, general database development, single and all source analysis, and report production and dissemination for all intelligence data and information for any enemy activity.

FORCE PROJECTION PLANNING

4-19. The JFC's operational plan (OPLAN) provides missions, force packages, and a clear description of the CINC's intent and campaign. The ARFOR Commander initiates development of one or more OPLANs supporting the JFC's OPLAN(s). Initial coordination and input to that OPLAN provides indications of expected Army levels of effort to include Army TMD requirements. The intelligence analysts from the ACE initiate the IPB process and request intelligence data and information from the Joint Intelligence Center (JIC) and other sources on enemy TM systems and

capabilities. The ARFOR staff conducts the planning and coordination required to produce the OPLAN(s) to include planning for alerting and mobilizing all active, reserve, and National Guard units authorized in support of ARFOR operations.

4-20. The AAMDC supports ARFOR OPLAN preparation by developing an air and missile defense annex that supports the AADC's air defense plan for the theater. The air and missile defense annex consists of the following:

- Enemy and friendly situation.
- AAMDC mission.
- Concept of operations by TMD operational element and by phase of the OPLAN.
- Tasks to subordinate units.
- Coordinating instructions.
- Service and support.
- Command and signal.
- Detailed appendices on TMD intelligence, attack operations, active defense, passive defense, communications, and C^2W.

The air and missile defense annex should also address:

- Army TMD peculiar communications.
- Army TMD automation and logistics requirements.
- Joint and multinational TMD capabilities and integration requirements.
- Nonstandard sensor-to-sensor cueing procedures.
- Army TMD priorities.
- Commander's Army TMD attack guidance.
- ROE for active defense and attack operations.
- Identification criteria for active defense and attack operations.
- TM warning procedures.
- Coverage and deconfliction of fires.
- Locations of corps and multinational air and missile defense units.
- DAL.

4-21. The AAMDC (using TM intelligence data continuously collected, stored, and analyzed during routine, day-to-day operations) may assist the ARFOR and JFC staffs in preparing contingency plans (CONPLANs). The AAMDC recommends types of Army units that can best support Army TMD in the area of responsibility (AOR) described in the CINC's warning order. If CONPLANs are already written, the AAMDC may assist the ARFOR or JFC staffs in preparing OPLANs by recommending Army units that can best support the Army TMD mission in the AOR.

4-22. Major headquarters and staffs, subordinate to the ARFOR Commander receive their mission statements and probable force packages for their planning from the ARFOR Commander OPLAN(s). Upon receipt of the ARFOR Commander's warning order, intelligence analysts initiate their IPB process by requesting intelligence data and information from the ACE and other threat databases.

4-23. The DOCC initiates specific planning and coordination to ensure deep operations and attack operations considerations are included in the OPLAN(s) development. The AAMDC assists in providing a TM focus to the DOCC considerations. Key attack operations considerations, depending on METT-TC, include but are not limited to:

- TM threat expected in the corps operational area.
- Composition of the force package(s) or available attack operations capable forces during entry and decisive operations.
- Availability of joint and multinational forces capable of conducting attack operations.
- Status of target identification, priority, and designation procedures, et cetera.
- Known and potential locations of TM launchers, et cetera.

STAGES I AND II—MOBILIZATION AND PREDEPLOYMENT

4-24. Mobilization begins with a presidential decision and after the combatant commander receives and distributes an alert order. Predeployment planning and preparations follow mobilization, provided the situation causing the alert has not changed for the better.

PLANNING

4-25. In an undeveloped theater, the principal challenges are shortening the time required to deploy Army TMD-capable forces and ensuring the availability of Army TMD resources, when required, in theater. In an undeveloped theater, entry operations and the introduction of personnel and equipment by air or sea may limit the opportunity to establish an immediate, robust Army TMD capability. However, forces are flowed into a theater based on the threat and the mission. The JFC may decide to deploy a robust TMD capability into theater first through priority of transportation assets to TMD forces. The limitations of entry operations may preclude availability of some communications normally found in a developed theater. However, Army TMD communications must ensure the timely and seamless delivery of critical information.

4-26. The ARFOR Commander and major subordinate commanders refine their OPLANs as required to execute the OPLANs as OPORDs as soon as possible after the JFC has begun his update. The IPB is updated with emphasis on developing friendly and enemy land component courses of action (COAs) and the following:

- The AAMDC focuses IPB intelligence data updates and analyses on threat TM systems and capabilities.
- IPB in support of passive defense refines information on specific NBC payload/delivery capabilities in the expected operational area.
- The COAs are analyzed to optimize OPORDs providing the best support of the JFC's concept of operations and intent.

4-27. COA development takes into account the integration of C^4I with joint and multinational forces by making maximum use of existing communications and communications infrastructure (Army, joint, and

multinational) to collect and disseminate enemy TM information. COA development also begins identification of TM HPTs and begins the Decide phase of the D^3A process.

4-28. The AAMDC Commander plans Army TMD operations in support of the JFC concept of operations and intent. The AAMDC conducts a mission area analysis; develops COAs; recommends priorities; determines passive defense requirements; refines IPB; coordinates with the JFACC, AADC, and ACA; provides in-theater TAMD expertise; monitors ADA unit status; and task organizes EAC ADA units as required. The AAMDC produces the air and missile defense annex for the ARFOR OPORD. The AAMDC provides target nominations for TMD attack operations to the DOCC, coordinates intelligence updates with the ACE and AAMDC LNOs, and coordinates active defense ROE with the AADC. The AAMDC recommends and coordinates an Army TMD design supporting ARFOR and joint planning. Also, the AAMDC recommends a force warning criteria and methodology for ARFOR Commander approval.

EXECUTION

4-29. As OPORDs are completed, the AAMDC conducts vulnerability analyses of unit locations and operational areas. This is accomplished for the ARFOR Commander situational awareness and to assist in coordinating the Army TMD design. Lastly, during these stages, all headquarters and support units continue to conduct focused training on expected mission requirements and procedures to support all expected missions.

STAGES III AND IV—DEPLOYMENT AND ENTRY OPERATIONS

4-30. Deployment includes the continuous movement of units, personnel, equipment, and supplies, using all available transportation means, throughout a campaign. Deployed forces conduct entry operations to establish a lodgment, build up, and expand the lodgment area. Early entry operations requirements following deployment will vary, but forces may have to move immediately to combat operations. They may need to take advantage of an opportunity, protect the force from RSTA operations and TM attacks, or even conduct retrograde operations to gain time for additional force build up. Forces are most vulnerable and the success of the campaign is at greatest risk during initial entry operations. This vulnerability is acute when the enemy possesses TMs with WMD/WME payloads.

PLANNING

4-31. Based on JFC's guidance and objectives, component commanders plan Army TMD operations to include establishment of C^4I networks and a TM attack warning net. Commanders and staffs have a broad array of communication resources available such as Army Common User System (ACUS), combat net radios (CNR), and broadcast nets. These are configured into networks that satisfy the information exchange requirements of Army TMD C^2 structures.

4-32. The ARFOR Commander must evaluate the potential TM threat faced in the theater and ensure that the proper Army TMD resources are allocated to meet the threat. Units supporting the Army TMD plan should also be

sequenced in the time-phased force deployment data (TPFDD) so that Army TMD capability can be established with the overall JFC priorities and risk assessment. Generally, the AAMDC and EAC ADA brigades remain OPCON to the ARFOR, who employs them in accordance with JFC-approved ROE and weapons control procedures developed by the AADC.

4-33. ARFOR Commanders with attack resources coordinate and conduct their operations according to Army and joint doctrine and procedures. Effective attack operations require real-time coordination between all component commanders as well as continuous wide-area surveillance of the entire AOR, with emphasis on enemy TM systems and support, fabrication, assembly, and launch areas. Coordination of attack operations initiated in the Decide phase of the D^3A process involves the detection, acquisition, and identification of enemy TM systems and the dissemination of targeting information to the designated attack asset for execution. These tasks are directed to subordinate elements as missions for execution. BDA is an integral part of the attack operations concept.

4-34. Planning for passive defense is conducted at all levels. One of the principal C^4I imperatives to passive defense is "warn the force." Commanders and staffs should carefully plan appropriate tactics and techniques for warning the force. All units must have the ability to receive force warnings. Warnings may be general (that missile launches are imminent or have occurred) or specific (areas that may be affected by missile impact, fall out, or the downwind hazards from NBC payloads). Technology is critical in effectively warning the force of TM attack or of possible NBC hazard. Commanders and staffs should consider a variety of aspects in planning force warning, including warning method (cascading, broadcast, or pinpoint warning protocols and architectures) and, probably most importantly, the force impact of warning. BDA reports are submitted to the various command posts (CPs). They are part of the basis for refining the IPB products and operational guidance and priorities.

EXECUTION

4-35. Forced entry is seizing and holding a military lodgment in the face of armed opposition and may include using airborne, amphibious, or air assault forces. Air and space-based systems and special operations provide a supporting role in forced entry operations. The TM threat should be assessed, and an appropriate defense should be provided to counter the expected threat. The AAMDC may control all Army TMD operations, with the exception of attack operations in support of the ARFOR during early entry operations. The AAMDC will support TMD attack operations through a detailed TM IPB. AAMDC LNOs will deploy to the JFACC/AADC and JFMCC to facilitate TMD unity of effort and integration.

4-36. Army TMD execution during deployment and entry includes early establishment of an integrated C^4I capability to support the JFC's concept and priorities for joint TMD. It provides force and critical asset protection from TM attack through the conduct of attack operations, active defense, and employment of passive defense measures to include a robust, early warning capability.

Integrated C4I Capability

4-37. ARFOR intelligence activities update and use the intelligence synchronization matrix and other factors to provide timely and relevant intelligence from national and in-theater resources. TMD targets and TMD decision points are included in the intelligence synchronization matrix and correlated to available intelligence sources and information requirements. Special Operations Forces (SOF) units and standoff sensor identify known or suspected TMD attack operations targets. In addition to assigning and monitoring intelligence collection missions and collecting information, intelligence staff at the AAMDC process information and information requests. The ASAS and ACUS systems are used to collect, store, and disseminate information within and between organizations. For TMD operations, this includes planning for direct sensor/processor to shooter communication links to ensure quick responses to validated attack operations targets. Data from ground and space-based intelligence sensor systems, including national, theater, Air Force, Navy, and SOF, are processed in the ACE to provide all source intelligence for the corps and subordinate units.

4-38. Selected high priority messages from sensor systems will be sent via TIBS/TDDS to those elements with receivers. TMD-related intelligence data is received and processed in the AAMDC, ACE, G2, and S2 TOC cells in battalion size units and larger for all battlefield operating systems involved in Army TMD operations. Intelligence cells continuously process information to update TOC operations and assist in TOC planning for future Army TMD attack operations, active defense, and passive defense. During these stages, sensors may identify movement of a TBM launcher or TBM infrastructure activity that may indicate a TBM launch is imminent. If identified, targeting analysts within the AAMDC and ACE recognize the movement or activity as a potential attack operations target. Depending on how the movement was identified, the AAMDC coordinates with the ACE to task sensors to confirm the movement or activity, track the vehicles, or confirm the identification of the vehicles. This may involve tasking Joint Surveillance and Target Attack Radar System (JSTARS) and the Common Ground Station (CGS) for more information, tasking for initiation of a specific UAV mission, or requesting information through the JSOTF or Special Operations Command and Control Element (SOCCE) (if assigned). At the point where target identification is confirmed and an accurate location is available, the AAMDC or the ACE will nominate the target as an attack operations target to the DOCC. The DOCC may pair the target with aviation or artillery attack assets. This will be accomplished digitally from the DOCC to the fire support element (FSE).

4-39. A confirmed launch triggers reactions by a preplanned selection of appropriate TMD systems, in accordance with established ROE. Short missile flight times require that available air, land, sea, and space-based sensor and surveillance asset report will be integrated to provide a current air and space picture. Near real-time communications enable this critical integration process. Space-based systems should be responsive to the JFC or multinational force commander. The C4I systems supporting TMD provide for centralized coordination and decentralized execution of TMD operations.

4-40. During the decision process, a determination of the need for BDA was made. BDA requires the commander to determine damage after attack.

Intelligence collection managers are notified when targets are being attacked and execute the plan for appropriate sensors to observe the target and gather data leading to an ability to assess the extent of damage to that specific target. Accumulation of this intelligence with other data being collected permits the development of BDAs against functional areas of the remaining threat capability.

Force and Critical Asset Protection

4-41. The AAMDC, BCD, and DOCC will deploy early providing the JFC and ARFOR Commander the ability to exercise control of Army attack operations, active defense, and passive defense assets. Initial communications support must ensure the AAMDC has linkage to all operational elements. The AAMDC nominates known enemy TM assets to the DOCC. Targets, which cannot be attacked by Army assets, are passed by the DOCC to the BCD. The BCD nominates them for enclosure in the draft Joint Integrated Prioritized Target List (JIPTL) developed by the JFACC, BCD and other component LNOs at the JAOC (Guidance Apportionment and Targeting (GAT) Cell) and then submitted to the JFC staff for the JTCB (if established). Key activities for the AAMDC during entry operations are:

- Provide the TAAMDCOORD.
- Provide DAADC, if appointed.
- Provide LNOs to appropriate C^2, communications, and intelligence nodes.
- Participate in the ARFOR and JFLCC, if appointed, planning processes.
- Conduct CVRT analysis.
- Develop and coordinate the collection plan for active defense and attack operations.
- Refine IPB.
- Coordinate and deconflict TMD operations planning.
- Refine the passive defense plan.
- Establish communications connectivity.
- Monitor friendly and enemy situations, providing an integrated air and ground situation.

4-42. If a mission is determined to fit a SOF profile, the AAMDC will request the mission through the DOCC and notify the AAMDC JSOTF LNO. The ARFOR staff will submit the request to the JFC's Joint Operations Center (JOC). The SOCCE, if available, can forward the request to the JSOTF and alert the JSOTF staff of a possible SOF mission.

4-43. **Attack Operations.** Concurrent with defensive actions, TM system targets identified in the IPB database are included in the JFC's plan for preemptive strikes or operations at the onset of hostilities. Observed enemy activity, TM signatures, or characteristic pre-attack conditions trigger timely execution that has been anticipated through the D^3A targeting process. If the JFC policy is that TMs will be attacked when moved from hide sites, storage sites, or reload locations to potential firing locations without waiting for first attack, then sensor systems begin tracking of all TELs as priority targets.

Trigger event reporting will become the primary portion of intelligence support to rapid reaction targeting.

4-44. If aviation assets are requested to search for and destroy TM targets, MI analysts are alerted to the planned aviation mission and the requirements to support it. Selected sensors and analysts are instructed to observe the critical elements for the tip-off activity that is needed to trigger the aviation launch to search and destroy. The report is passed directly to the aviation brigade. At the same time, a continuous update of all enemy activity, with specific emphasis on anti-aircraft artillery, surface-to-air missile (SAM) sites, and weather predictions are provided to the aviation brigade S2 for forwarding to the battalion C^2 element. Watch is maintained on the movement of enemy elements along ingress and egress routes and in the vicinity of the target through the JSTARS CGS. Updates are forwarded directly to the aviation brigade. Updates will be provided until the attack units have completed the mission and returned. Attack helicopter units routinely perform BDA as an integral part of the mission.

4-45. Opportunities are normally available for use of various sensors working together in a cross-cueing mode to obtain details on specific enemy elements. The purpose of cross-cueing is to obtain different types of intelligence such as current activity; location; use of radio or radar emitters; or movement, direction, and speed on a given enemy element. Three factors affect the sensor selection process: sensor availability, current knowledge, and type of additional knowledge required to support the desired action.

4-46. Intelligence collection and management should include tasking analysts to rapidly cross-cue supporting intelligence assets to confirm targeting data and ensure timely attack. For example, a JSTARS CGS operator detecting a possible TEL may be required to cross-cue and confirm the target with the CGS supporting the unit tasked to attack the target. The AAMDC intelligence analysts continually update their database and provide NAI, target areas of interest (TAI), and target nominations to the DOCC.

4-47. Once hostilities are initiated, all targets acquired are attacked based on the commander's guidance. Attacking TM capabilities as early as possible after commencement of hostilities may prevent the launch of a substantial number of TMs.

4-48. C^2W is employed against an enemy's C^3 surveillance and target acquisition assets to disrupt TM operations. This aspect of attack operations will influence, degrade, or destroy enemy C^3 capabilities and may be closely linked to a deception measure. The primary goal is to destroy enemy acquisition and detection capabilities and thereby enhance overall protection of the force.

4-49. BDA will be based on information collected by a variety of sensors. Specific BDA data is best collected by imagery intelligence (IMINT) or human intelligence (HUMINT) assets with line of sight to the target just after the weapons delivery. This assessment provides information on target destruction. Sensors from the attack platform may be available to conduct an initial assessment, but subsequent collection may also be required. Sensor selection will be based on system resolution, availability, and other priorities.

4-50. **Active Defense**. Units identified to conduct active defense may deploy early during operations to defend the force and critical assets. Defense planning is a distributed process occurring at all echelons. The JFC normally issues planning guidance by phase. The JFC or, if delegated, the JFACC/AADC tasks components to develop detailed priorities. The components conduct COA analyses to prioritize their defended assets based on phases. The AAMDC is involved in this process by assisting the ARFOR and AADC in planning and coordination of the DAL. The JFC or JFACC/AADC with the components, go through an arbitration process to coalesce all priorities into a single list. Once the DAL is published, ADA brigades conduct their defense planning which includes, but is not limited to: weapon; sensor; and communications locations, relays, logistics, et cetera. ADA battalions and task forces continue to refine these plans to execute active defense for TMD. Active defense during these stages is essential due to the vulnerability of deploying forces. Active defense provides a measure of security during deployment and entry stages of force projection operations.

4-51. Units at EAC capable of conducting active defense normally consist of at least one ADA brigade that provides C^2 for one or more Patriot battalions or air and missile defense task forces (AMDTF) and battalions. These task forces may consist of Avenger, Patriot, and Theater High Altitude Area Defense (THAAD) fire units. ADA units at EAC receive missions from the AAMDC to defend the force and critical assets from the CINC's DAL (at the joint level there are DALs; however, at the Army and lower levels there are air and missile defense priorities).

4-52. Corps active defense units normally consist of an ADA brigade that provides C^2 over ADA battalions. The corps ADA brigade task organizes ADA resources to protect the corps and division commander's air and missile defense priorities. Corps/division ADA units receive missions from the corps commander to protect forces and critical assets. The TAAMDCOORD will ensure the corps active defense requirements are integrated into TMD planning.

4-53. Intelligence information resulting from enemy TM activity is distributed from the AAMDC, ARFOR staff, task force TOCs, and other sources to the ADA brigade and battalion TOCs through ACUS. Units conducting active defense receive early warning of a TBM launch from Army or joint systems, namely JTAGS, Attack and Launch Early Reporting to Theater (ALERT), and Tactical Data and Reporting (TACDAR), which are elements of TES. Early warning messages are transmitted via TIBS/TDDS and Joint Tactical Information Distribution System (JTIDS). National and joint sensors provide early warning of CMs, ASMs, and airborne TM launch platforms. The warning is quickly relayed through digital information links to respective TOCs and appropriate fire units.

4-54. **Passive Defense Warning Capability.** Tactical warning is provided to the force over the JFC warning net. Observed pre-launch indications or activity will be forwarded to Army elements to provide early warning of possible incoming missiles. The warning is also used to update the local readiness posture. The JFC warning net obtains data from space, air, and surface-based sensors (both national and theater) that detect missile launches or track missiles in flight. Warning data should be transmitted immediately

to appropriate commands and, if known, to targeted units and civilian authorities. Passive defense measures should be activated.

4-55. A force warning capability is necessary from the deployment stage throughout all force projection operations. Early in a force projection operation, the AAMDC may assume a primary role in warning the force. The AAMDC may retain this responsibility in a developed theater. When the DSP or other sensors detect a TM launch, the information is directly down-linked and processed by JTAGS and other intelligence information processing stations. These processing stations process the raw IR data and disseminate a warning message over CINCSPACE-specified networks. Event release criteria for JTAGS (and TES overall) is governed by USSPACECOM Unified Instruction (UI) 10-30. Dissemination of the in-theater voice warning is dictated by the theater CINC. The AAMDC monitors the warning dissemination procedures established by the ARFOR Commander for the operational area and will, per commander's guidance, selectively transmit a warning to units and population centers within any hazard area. JTAGS disseminates the predicted ground impact point/time (PGIP/T) and can provide a refined PGIP/T at regular intervals. As more accurate PGIP/T information becomes available (for example, if applicable, from the THAAD radar), a refined warning may be disseminated by the AAMDC. The AAMDC should also provide an intelligence assessment on possible TM effects (for example, high, low, or no NBC threat) along with the warning. This transmission should be sent from the AAMDC over automated and manual communications systems. The AAMDC may also establish a Pager Alert Warning System (PAWS) in theater to warn the force. Effective communications are essential to provide the information required at each level to support the execution of passive defense plans. Subordinate headquarters are responsible for disseminating the warning down to each soldier. Units must rely on organic equipment and systems to pass warnings down to soldiers. Units also use organic communications to forward BDA reports.

STAGE V—DECISIVE OPERATIONS

4-56. Operations involve commitment of forces in combat against an enemy force to achieve decisive victory with minimum casualties. TMD is vital when the enemy possesses a robust TM force, WMD/WME capability, and a history of their employment. TMD protects the force, allowing freedom of maneuver to accomplish the mission. The decision to initiate operations may be predetermined, or it may be tied to specific enemy actions.

PLANNING

4-57. The ACE continues to collect, analyze, and disseminate intelligence supporting the close battle and Army TMD operations. The AAMDC recommends adjustments to the ARFOR Commander's Army TMD design based on joint and Army TMD decisive operations requirements. The TAAMDCOORD continues to provide the ARFOR Commander with active defense expertise, making recommendations for improving protection and better supporting the operational concept and ensuring communications networks support Army TMD design adjustments. As in all stages, the DAL is

continually reassessed and recommendations are forwarded to the JFC. The DOCC conducts target management optimizing both Army TMD and non-Army TMD deep operations. Additionally, ARFOR staff and AAMDC plan for post conflict Army TMD operations.

EXECUTION

4-58. Reconnaissance and force protection against TM operations remain crucial to the JFC and ARFOR plans as they engage the enemy in combat operations. Actions to counter the enemy's RSTA efforts help maintain the conditions created earlier for decisive operations. Whereas overall Army TMD operations may vary depending upon threat TM activities, joint and Army TMD C^4I execution during decisive operations remains essentially as previously described.

STAGES VI AND VII—REDEPLOYMENT AND POST CONFLICT

4-59. Deployed forces transition to a period of post conflict operations upon cessation of hostilities. This transition can occur even if residual combat operations are still underway in parts of the theater of operations. Post conflict focuses on restoring order and minimizing confusion following the operations, reestablishing host nation or area infrastructure, preparing forces for redeployment, and continuing to provide a presence to allow other elements of national power to achieve the overall strategic aims.

4-60. The IPB process continues; the ACE continues to execute intelligence collection activities related to remaining TM targets. Any intelligence on new threat capabilities based on data derived from impact analysis or from post-launch activity is used to update known threat capabilities, doctrine and procedures, and is passed to all operational elements.

4-61. Typically, Army TMD forces are required to continue providing force protection so long as there is a TM threat. TMs, due to their long range and short delivery time, make excellent retaliatory weapons and can be employed solely for political and propaganda reasons.

4-62. The AAMDC oversees Army TMD design adjustments and continues to provide fused situational awareness to the ARFOR and AMDCOORDs. The AAMDC also recommends priorities to supported commanders just as in the operations stage. The DOCC continues to conduct target management and plan attack operations should decisive operations resume. Communications networks are established or reestablished as required and continue to support Army TMD communications requirements. Army TMD-related ROE are revised as required. Lastly, headquarters and support units review operations, document Army TMD lessons learned, and plan for redeployment and reconstitution.

4-63. Reconstitution and recovery activities do not normally contribute to intelligence processes. Disruption of friendly capabilities may cause a revisit of anticipated threat activities in a limited wargaming of potential COAs. As in early entry, Army TMD forces remain vigilant as long as there is a TM threat. Headquarters and support units redeploy and reconstitute to achieve readiness status as required, submit Army TMD lessons learned to higher

headquarters, and resume training. C4I units and active defense forces may be among the last units to redeploy. Active defense forces may remain in theater in a SASO demonstration of support and resolve to preclude further enemy aggression.

STAGE VIII—DEMOBILIZATION

4-64. Demobilization is the process by which units, individuals, and materiel transfer from an active to a premobilization posture or to some other approved posture. Although the overall focus of demobilization is generally on units and individuals, the demobilization of logistics also requires significant resources such as supplies, materiel, and support activities. It also involves returning the mobilized portion of the industrial base to peacetime conditions.

4-65. Demobilization ensures rapid reconstitution of units and prepares for future mobilization to meet other contingencies. Demobilization is conducted in the following phases:

- Demobilization planning actions.
- Demobilization actions in the operational area.
- Port of entry (POE)-to-demobilization station actions or POE-to-continental US (CONUS) demobilization center actions.
- Demobilization station and CONUS demobilization center actions.
- Home-station or home-of-record actions.

Chapter 5

Attack Operations

This chapter provides a detailed description of Army TMD attack operations at the ARFOR and corps level. This includes a description of resources and processes that are basic to attack operations. It also includes tactics and techniques required for effective attack operations.

The purpose of Army TMD attack operations is to destroy the enemy's capability to launch TMs by eliminating his ability to build, distribute, support, and command his TM systems within the ARFOR Commander's AO. Enemy TM systems and infrastructure must be denied sanctuary anywhere within the theater jeopardizing US forces or objectives. TM infrastructure includes launch platforms, support facilities and equipment, C^2 nodes, RSTA, and missile stockpiles. Attack operations are accomplished proactively, before TM launch, or reactively, after TM launch.

GENERAL

5-1. The JFC will establish supported and supporting relationships as the situation and mission warrant; however, he will normally designate surface component commanders as the supported commanders for TMD attack operations conducted within their respective AOs. Within the joint force theater and/or JOA, all missions must contribute to the accomplishment of the overall objective. Synchronization of efforts within surface AOs with theater- and/or JOA-wide operations is of particular importance. To facilitate synchronization, the JFC establishes priorities that will be executed throughout the theater and/or JOA, including within the surface commander's AOs. Therefore, JFC-designated commanders, in coordination with the surface component commanders, those commanders designated by the JFC to execute theater- and/or JOA-wide functions have the latitude to plan and execute these JFC-prioritized operations and attack targets within the surface component commanders' AOs. Army TMD attack operations generally can be conducted throughout the breadth of the assigned AO. Surface component commanders and the JFACC can also request assistance from other services in the conduct of TMD attack operations within assigned AOs. This arrangement allows any of the component commanders to obtain assistance from one another if organic and supporting assets are insufficient to attack a designated target. For example, if a target within ARFOR AO is beyond the range of Army attack assets, the ARFOR Commander may request assistance from the JFACC to attack it.

5-2. Army TMD attack operations are conducted using the same process as other attack operations. The major difference between TMD and other attack

operations is TMD attack operations may require a faster tempo to engage time sensitive mobile targets. It is only one of many operations that assists the commander in achieving and maintaining agility and initiative, while depriving the enemy freedom to conduct operations. Destroying TMs provides immense leverage against the enemy's plan and disrupts his tempo and synchronization of operations by forcing changes within the enemy's decision cycle. The relentless pursuit and destruction of enemy TM systems and capabilities must be maintained. Integrated Army TMD attack operations requires the integration of intelligence, fire support, Army aviation, EW, air and missile defense, and joint operations. Commanders and staffs must coordinate and synchronize TMD attack operations within the framework of both offensive and defensive operations.

5-3. C^4I activities provide for centralized management of planning tasks and functions necessary for attack operations. Intelligence units dispense information for operational missions through the most expeditious communications channels. Decentralized execution improves attack operations responsiveness by allowing rapid dissemination of target information received from acquisition sources and alerts C^2 nodes and attack platforms for attack of HPTs. If the commander selects decentralized execution for certain targets, such as TELs, he will designate a subordinate commander as the engagement authority. Decentralized execution will require appropriate sensor processing facilities to be positioned with a subordinate commander having execution authority.

DECIDE, DETECT, DELIVER, AND ASSESS PROCESS

5-4. The D^3A methodology is an integral part of the military decision-making process from the receipt of the mission through execution. This methodology organizes the efforts of the commander and his staff to accomplish key targeting objectives (see Figure 5-1). It enables commanders to respond rapidly with synchronized operations to events vital to establishing favorable conditions for mission accomplishment. The D^3A methodology is a process that helps the commanders structure attacks of HPTs (for example, TM targets) and creates a favorable battle tempo for friendly forces, particularly at decisive points and times during attack operations.

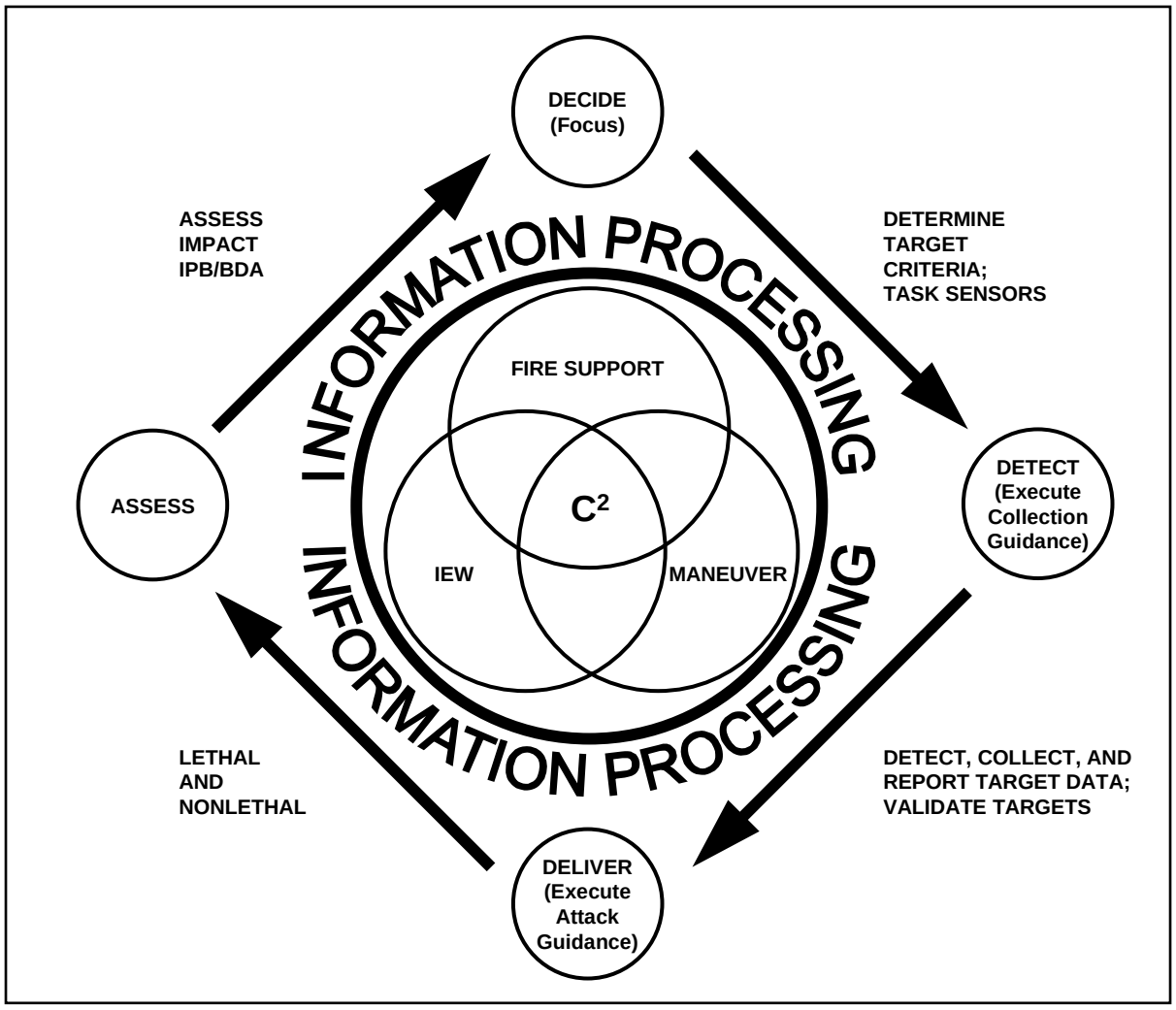

Figure 5-1. D^{3}A Process

5-5. This methodology requires extensive lateral and horizontal coordination, which the staff does, based on the commander's intent. In planning operational fires, both ground and air component commanders consider the effects that all fires have on decisive combat operations. Targeting for TMD attack operations uses the same process as all deep attacks. The D^{3}A process fully supports TMD attack operations.

DECIDE

5-6. In the Decide phase, targets are identified for engagement. Fire support, intelligence, and operations personnel decide what targets to look for, where the targets can be found on the battlefield, who can locate targets, and how the targets should be attacked. Together, they determine the available assets to be allocated and additional assets required, and they identify channels needed to provide acquisition information on a near real-time basis.

5-7. The Decide phase requires close interaction among commanders and the intelligence, plans, operations, and fire support cells. The goal of the Decide phase is to provide a clear picture for the tasking of sensor systems, information processing, selection of attack means, and the requirement for BDA. A commander may designate specific firing units or other attack assets to support organizations conducting TMD operations. Commanders and fire support coordinators (FSCOORDs) determine the method of control (centralized versus decentralized). Once specific targets are determined and units are assigned to engage the targets, munitions must be allocated accordingly. This is to ensure that firing units have the right munitions on hand to execute the mission at the right times.

DETECT

5-8. The Detect phase is designed to acquire the targets selected in the Decide phase. In this phase, target acquisition assets are focused on specific areas of interest. Targets must be monitored after detection, especially mobile targets.

5-9. During the Detect phase, sensors search designated areas (NAI, TAI, and engagement areas) for HPTs. As information is collected, it is processed in the ACE and fused targetable intelligence is produced. Some detected TM targets may not be engaged immediately. Such targets must be continuously tracked by sensor systems until such time as they are attacked.

5-10. Because of target location errors (TLEs) associated with identification of initial launch point and the short dwell time of some TM ground launch systems, engagement at the launch point may not be a viable option. With the fielding of enhanced sensors, the attack of launch sites is more effective. Additional sensor systems will be used to locate the targets accurately. If the TM target is ground based, the preferred scenario is for a sensor system to track a vehicle or convoy from the launch point back to its hide point or rearm/logistics support node and engage the target at this location. This makes for a more lucrative target to attack.

DELIVER

5-11. The Deliver phase is the attack of specific threat targets. These attacks will be conducted in accordance with the appropriate commander's established attack guidance.

ASSESS

5-12. Assess is timely and accurate estimate of damage resulting from the use of military force, either lethal or nonlethal, against a target. Although primarily an intelligence function, it requires extensive coordination with operational elements to be effective.

5-13. The Assess phase provides feedback regarding whether or not the commander's guidance has been met. Attack operations elements that attack with "eyes on target" (that is, Army aviation, SOF, other services fixed-wing aircraft) can perform BDA during the attack mission and provides the commander with the quickest feedback. When there is no surveillance on targets or no confirmation that a target was destroyed, a BDA mission may be required. The request for the mission will be made and can be

accomplished by intelligence sources ranging from strategic to tactical sources such as UAVs. The results of the BDA mission may determine whether or not a restrike is required.

ATTACK OPERATIONS ORGANIZATION

5-14. Army TMD attack operations must interface with joint organizations at both the service component and the JFC level. The JFC has, or may designate, a representative to plan and coordinate TMD attack operations.

5-15. The ARFOR Commander ensures unity of effort and purpose by organizing fires in his AO. The ARFOR staff is a major planner of operational fires and allocator of fire support resources. The ARFOR allocates or controls resources, designates missions to subordinates, attaches forces, establishes support relationships or controls usage, specifies the degree of risk, and retains systems control. A primary consideration is the allocation of scarce operational fires resources.

5-16. The ARFOR Commander and his staff play a major part in coordinating joint and multinational assets. Under the guidance of the JFC, land, air, and maritime components execute major operations designed to attain strategic objectives. This process entails component coordination and cooperation in the employment of all fires.

ARMY AIR AND MISSILE DEFENSE COMMAND

5-17. The AAMDC provides the ARFOR with the ability to exercise control of assigned air and missile defense assets if required during force projection entry operations. During this phase, deploying forces build up and expand their lodgments. The AAMDC ensures enemy TM assets are targeted and "on-order" fires are planned against these targets.

5-18. As the theater matures, the AAMDC fuses and synchronizes battlefield situation information for the ARFOR. This adds value to the contributions of other battlefield operating systems. The AAMDC displays status, locations, and engagement capabilities of the designated assets responsible for conducting TMD operations. The AAMDC interacts with the fire support system to ensure TM marshaling areas, assembly points, and launch locations are part of the overall fire support plan.

5-19. The AAMDC will deploy LNOs to appropriate TMD elements during deployment and entry operations. These LNOs are necessary to enhance the coordination and communication between various elements and the AAMDC throughout the conduct of TMD operations.

BATTLEFIELD COORDINATION DETACHMENT

5-20. The ARFOR Commander effects coordination with other services through joint service liaison elements. The ARFOR Commander provides the BCD to the service component commander designated as the JFACC, and co-locates it with the JAOC. The BCD expedites the exchange of information through face-to-face coordination with elements of the JAOC. The JAOC is the operational facility in which the JFACC centralizes the planning, direction, and controlling functions over all combat air resources. In order to

integrate the TAMD battle, the BCD supports the ARFOR TAMD Cell/ADE responsible for TAMD in theater. The ARFOR Commander specifies the role of the BCD to help in coordination of TMD attack operations with the JAOC. Once the AAMDC deploys to theater, it will assume the functions of the ARFOR TAMD Cell, and the BCD will support the AAMDC in TAMD

5-21. The BCD's basic mission is to facilitate the synchronization of air and ground operations. The BCD represents the ARFOR Commander; coordinates with the ARFOR staff; and receives ARFOR Commander objectives, guidance, and priorities through the ARFOR operations center (G3). Specific missions include:

- Processing land forces' requests for air support.
- Monitoring and interpreting the land battle situation for the JAOC.
- Providing the necessary interface for the exchange of current intelligence and operational data.
- Coordinating air and missile defense and airspace control matters.

5-22. Historically, the BCD has worked with the Air Force Forces (AFFOR) in this coordination role, but with the changes in world environment and joint doctrine, the Army BCD can expect to work in contingency operations with the Marine Forces (MARFOR) and Navy Forces (NAVFOR) (see FM 100-13 for detailed information on BCD operations).

DEEP OPERATIONS COORDINATION CELL

5-23. The DOCC plans, coordinates, and synchronizes Army deep operations. The purpose of the DOCC is to provide a focused, centralized planning and coordination element for all deep operations, which includes attack operations. The DOCC is involved with all deep operations involving field artillery, aviation, air and missile defense, intelligence, SOF (if tasked for specific missions), and ground maneuver units. The DOCC ensures effective and efficient employment of critical assets and synchronizes Army efforts with joint operations. This includes recommending the pairing of attack assets with targets and the coordination of assets to interact with and support each other. The DOCC orchestrates the efforts of the ARFOR staff normally associated with deep operations and must also coordinate with other staff elements. This includes the AAMDC, BCD, G2, G3, Army airspace command and control (A^2C^2) element, special operations coordinator (SOCOORD), FSE, engineers, and representatives from joint forces. The DOCC maintains situational awareness through use of a common database and fully automated decision aid tools that contribute to rapid planning and coordination. The goal of the DOCC is to provide effective, timely coordination, synchronization, and employment of assets dedicated to the prosecution of the deep attack battle within the ARFOR AO.

ATTACK OPERATIONS ELEMENTS

5-24. Army attack operations units do not normally exist at the EAC level. Attack operations at EAC level consist of planning and coordinating within Army and joint organizations. This includes planning and coordinating air interdiction operations within the ARFOR AO. To provide the JFC with a capability to conduct TMD attack operations early in a campaign, consideration must be given to packaging and deploying a TMD task force

with TMD capable fire support and combat aviation units with their appropriate control and support requirements for early entry into a theater. They provide options for conducting attack operations early in force protection. This package includes field artillery assets, attack helicopters, intelligence and electronic warfare (IEW), SOF, and active defense assets. The presence of Army tactical missile systems (ATACMS) or attack helicopters early in the introduction of forces provides the capability to conduct attack operations. Interdiction operations are employed to keep friendly forces outside the range of enemy attack systems. This attack operations strike force could conduct operations under the operational control of a DOCC.

FORCE PROJECTION PLANNING

5-25. For TMD attack operations, as well as other missions, early planning occurs prior to force projection. Subordinate units receive a general mission statement and probable force package. Units plan for wartime missions based on the force package. This planning begins with initiation of the IPB process. IPB may include analyzing enemy TM capabilities, identifying likely TM launch areas, determination of area limitations, et cetera.

5-26. As a result of this initial IPB during early planning, decisions are made concerning targets; conditions for attack; and asset assignment for surveillance, target acquisition, deconfliction, suppression of enemy air defenses, and attack. Asset assignment accounts for the varied contribution of each of the available attack means. For instance, Army field artillery rocket and missile units contribute to TMD attack operations capabilities by providing accurate firepower against TM targets of known location or those with short dwell times at known locations.

5-27. Army aviation contributes to TMD attack operations capabilities by providing attack helicopters to locate and destroy targets within generally defined search areas. Attack aviation is employed when precise target location is not known (that is, when the targets must be hunted and destroyed). Selection of attack helicopters for attack operations may take the form of initiating a new mission or diverting a mission already under way. If a new attack mission is generated and attack aviation forces have not been launched, time will be required for mission preparation. Some aspects of mission preparation include intelligence updates and planning ingress and regress routes. Army aviation has the capability to provide immediate BDA.

5-28. SOF may contribute to TMD attack operations capabilities. They deploy in theater to conduct unconventional warfare (UW), special reconnaissance (SR), or direct action (DA) missions directed specifically against TM-related targets.

5-29. EW directed against enemy TM C^2 infrastructures contribute to TMD attack operations. They disrupt the enemy's ability to communicate necessary TM commands and/or information.

5-30. Air interdiction will be provided within the ARFOR Commander's AO by supporting air units. It can contribute to TMD attack operations by

locating and destroying the TM targets that cannot be engaged by organic Army assets.

5-31. One of the most important aspects of TMD attack operations is the counter-RSTA fight. If timely enemy intelligence on friendly troop concentrations and movements are denied, the threat's use of TMs on friendly tactical targets can restricted. Counter-RSTA includes destroying threat intelligence communications and analysis nodes on the ground and the actual intelligence collectors. These collectors include satellites and air breathers such as UAVs or reconnaissance aircraft. Ground collectors include reconnaissance assets from tactical levels, strategic level SOF, and insurgents.

5-32. Also during early planning, unit commanders recommend time-phased force deployment list (TPFDL) priorities for their units. These commanders and their staffs also plan Class V configuration and sustainment and develop target management and numbering procedures.

5-33. Finally, all Army TMD attack operations capabilities are exercised during staff, CP, and field exercises. Such exercises must include integrating collected and analyzed intelligence as appropriate and emphasizing rapid reaction targeting and sensor-to-shooter links.

STAGES I AND II—MOBILIZATION AND PREDEPLOYMENT

5-34. Mobilization is a process in which the armed forces augment the active component capability in preparation for war and other national emergencies. As the operational tempo (OPTEMPO) in a theater of operations increases, NCA will determine the necessity to mobilize forces. The predeployment phase of force projection operations relies on a foundation of fully trained, well-led, properly equipped, and sustained units and soldiers to conduct TMD operations.

PLANNING

5-35. During mobilization and predeployment, planning cells in units at all levels prepare OPLANs/OPORDs. Specifically, attack operations-capable units prepare OPLANs/OPORDs in accordance with prioritized target lists and JFC-approved airspace control procedures and measures. As part of this preparation effort, units conduct detailed planning in coordination with AAMDC and DOCC to integrate attack operations with joint and multinational forces as well as provide input to the AAMDC and DOCC for attack operations ROE development.

EXECUTION

5-36. Attack operations forces task organize in support of OPLANs and OPORDs. The appropriate mix of attack systems and intelligence assets are placed high on the TPFDL, based on METT-TC. Factors influencing TPFDL placement include criticality of protecting deploying forces, critical assets, locations (for example, APODs, SPODs, logistic centers, and staging areas), and geopolitical centers during initial force projection entry operations.

5-37. SOF teams will deploy into an AOR early. These teams deploy from JSOTF assets and require no changes to any Army unit planning headquarters. Employment of SOF teams is a JFC option when other strategic assets (for example, national intelligence assets, Air Force, or Navy) cannot unilaterally accomplish the mission(s). Since there are a limited number of teams and long-range infiltration platforms available, SOF teams are considered only for the highest priority targets. If a corps is the major maneuver unit in theater, the corps can request SOF support. This support may be in the form of a SOCCE, established from within Army Special Operations Forces (ARSOF) assets, to coordinate with the DOCC. A corps may request SOF be employed for a specific mission of short duration. However, the mission must be one that only SOF is capable of conducting and the corps cannot accomplish because of organic asset limitation. SOF teams assigned SR or DA missions move into place and report, as their missions require or allow, to the SOCCE/JSOTF. The SOCCE then coordinates any intelligence data with the ARFOR.

STAGES III AND IV—DEPLOYMENT AND ENTRY OPERATIONS

5-38. The Army makes every effort to integrate the capabilities of deploying forces with host nations and forward-presence capabilities to maximize the available air and sealift assets. The requirements of entry operations following a deployment will vary. Entry may be in direct support of host nation or forward-presence forces conducting TMD operations.

PLANNING

5-39. Attack operations are planned and may be executed during deployment or entry operations stages. Units designated for attack operations missions immediately interface with sensor platforms and C^2 nodes upon arrival in theater. On order, these units deploy from lodgment or assembly areas into pre-determined areas and orient on search areas and TAI. This allows rapid deconfliction and fire support coordination prior to trigger events.

5-40. The IPB process has provided likely TM launch areas, area limitations, and prediction of enemy activities. Sensor collection tasks are modified based on the collection plan developed from the IPB. A multi-platform sensor mix is employed, providing tremendous capabilities and emphasizing acquisition of all parts of the target array (launchers, C^2, logistics sites, and RSTA). They enhance target acquisition capabilities through real-time exchange of target information among the sensors (tip-off, confirmation, location refinement, and counter deception), and between sensors and shooters to meet the critical timelines. Trigger events or significant actions that might key the decision to attack, such as TM launches, should be identified.

EXECUTION

5-41. TM attack operations can be proactive or reactive. The execution of attack operations spans the entire spectrum of Army, Air Force, Navy, Marine, and multinational capabilities. Situational awareness and diligent monitoring of enemy operations will provide the catalyst for the onset of attack operations.

Proactive Attack Process

5-42. Proactive attack operations are the preferred method for conducting attacks against the enemy's TM capability. Proactive attack operations deal with the acquisition and attack of TM threats that are within the ARFOR AO before they can be used against friendly forces or activities essential to friendly operations. Proactive acquisition and attack of relevant HPTs is most challenging for sensors and target analysts since there may be few observable events to trigger an engagement. Other factors that impact proactive acquisition and attack ROE are the enemy's use of decoys and deception. One capability to locate and identify TMD structure, targets, and TELs is provided by SOF.

5-43. The proactive engagement process begins when sensor platforms identify a TM target(s) such as TELs, support facilities and equipment, C^2 nodes, RSTA assets, missile stockpiles, and manufacturing and transportation assets. Once an intelligence analyst identifies a TM target on the high payoff target list (HPTL) that meets the attack guidance matrix (AGM) requirements and targeting standards, the target is forwarded to the DOCC for prosecution. If the TLE exceeds the established standards and it is a HPTL, the ACE attempts to re-task an available sensor to refine the TLE. Once refined, the updated target is sent to the DOCC for prosecution or monitored until the TLE threshold is acquired.

Reactive Attack Process

5-44. Reactive attack operations involve the acquisition and attack of TMs and TM infrastructure after they have been fired. Reactive attack operations may be warranted any time that TM infrastructure can be identified after a missile launch. Reactive engagement of TELs may take place during post firing phase but before launcher displacement. Engagements may also take place after launcher displacement.

5-45. The process begins when sensors detect a TM launch. Multiple systems generate warning messages, which are issued to the force based on the predicted impact area. Based on the launch point ellipse provided by sensors and terrain delimitation analysis, the ACE forwards a target nomination to the DOCC. The target is passed digitally from the ACE to the DOCC. Exactly when the launcher is attacked is based on METT-TC, acquisition assets, and attack assets. Reactive engagement of TM targets may be extremely time sensitive if the target involves individual, or a small number of vehicles or equipment, and is most stressing on the sensors, C^4I system, and the attack systems employed. Whether proactive or reactive, the DOCC targeting officer confirms the target meets attack criteria. The selection of an attack operation asset is based on pre-determined criteria published in the AGM/HPTL.

Centralized Attack Operations Execution

5-46. During centralized execution, the DOCC controls and coordinates all deep fire. The distinct advantage to centralized execution is that the DOCC has the most accurate "big picture" of the status of corps' deep strike assets, their positions, and availability. The corps DOCC is also best able to deconflict multiple attack assets attempting to engage the same target, as

well as to conduct the proper Integrated Combat Airspace Command and Control (ICAC²) coordination procedures.

5-47. Detected TMD targets are sent to the DOCC from a variety of sources (for example, the AAMDC, BCD, SOF, ACE, et cetera). If all attack operation assets are unavailable, the DOCC must first consider diverting attack assets (Army and other services) already in the vicinity of the target.

5-48. **Field Artillery.** If ATACMS has been selected to engage a target and is equipped with the ASAS/Advanced Field Artillery Tactical Data System (AFATDS), the following actions occur. The AFATDS will deconflict the target automatically, if it duplicates another request for fire or another active mission. It will automatically check the target nomination against the HPTL, ensure that the sensor's TLE is acceptable for attacking the target, ensure that the target decay time has not been exceeded, and check for violations of fire support coordination measures (FSCMs) or unit boundaries. It is important that air corridors are properly activated and inactivated within the AFATDS to ensure proper airspace coordination, particularly with Army aviation assets.

5-49. If the fire request violates any control measure or commander's guidance, the AFATDS will recommend that the operator either deny the mission or request clearance/coordination from the unit that established the control measure. This can be done digitally through AFATDS.

5-50. If the fire request is cleared, the AFATDS will produce recommended engagement solutions based on the AGM, the firing units availability, and range and munitions availability. The AFATDS will also calculate target area hazard (TAH) and platoon area hazard (PAH), and automatically transmit them to the AFATDS at the BCD (if equipped with AFATDS). This serves as either a primary means of notification for airspace clearance or a redundant back-up for existing cleared areas. If the postured launcher tactic is used, the AFATDS operator must refine the target location in the active mission of the "hot" unit and change the method of control to "when ready."

5-51. If the DOCC is equipped with Automated Deep Operations Coordination System (ADOCS), the fire request is received in ADOCS, and the target is manually checked against a map and overlay (or graphics workstation screen) for violation of boundaries or FSCMs. The target nomination is also checked against the AGM and HPTL posted above the workstation. Concurrently, the mission appears on the ADOCS screen of the A²C² and Air Support Operations Center (ASOC) workstations for airspace clearance/coordination. Once these workstations have cleared the mission, a firing unit is selected based on availability, range, and munitions availability.

5-52. The ADOCS can also conduct "weapon-target pairing." If a launcher is oriented on a target using the "stay hot and shoot fast" tactic, ADOCS will fuse the refined target location into the active mission of the "hot" unit and automatically change the method of control to "when ready." The mission can then be sent digitally through the field artillery (FA) brigade TOC to the MLRS battalion, battery, and ultimately to the launcher. This mission thread tends to take longer to process than a quickfire channel directly from the DOCC to the firing unit. A quickfire channel provides the quickest mission time and should be considered based on METT-TC and the need to rapidly

engage critical short dwell targets. If required, ACE may request a BDA mission. A re-strike decision is made by the DOCC in accordance with BDA requirements, the target importance, and BDA results.

5-53. **Aviation.** Although Army aviation is not an asset normally assigned a TMD mission, if attack helicopters are requested, the DOCC Army aviation officer, normally the aviation brigade commander, approves the mission. The aviation brigade staff then coordinates it as either a new mission or diverts a mission already being executed.

5-54. The aviation brigade staff plans and coordinates the mission with the corps staff and, if authorized, coordinates directly with the AAMDC. The size of the attacking force is determined in accordance with METT-TC, however a battalion-sized unit is the lowest level tasked to support a mission. Immediate employment will be execution of an OPLAN or a deviation of an OPLAN. The executing aviation battalion, which was identified previously in the Decide phase, most likely will employ elements postured at a heightened state of readiness. In the case of diverting a helicopter unit on a deep strike mission, the aviation brigade/battalion must direct the unit and coordinate to avoid enemy ground and air defense elements and friendly (joint) free fire areas or kill boxes. The aviation brigade staff coordinates search areas, routes of ingress and egress, and forward assembly areas (FAA). They also appropriately designate restricted fire area or restricted operations zone (ROZ) control measures to be activated upon execution of the OPLAN. One or more attack helicopter battalions may be placed in an OPCON command relationship to the commander of a coordinating headquarters in support of TMD attack operations, and under some circumstances (for example, in entry operations), the aviation staff(s) may interface directly with the coordinating headquarters. The aviation unit(s) is dependent on the headquarters for coordinating with joint assets for intelligence products and sensor tasking, fire support, airspace, and ground space for positioning forward arming and refueling points, if required, and FAAs. The current method of coordination is through face-to-face interactions, written documents/overlays, and voice communications. Organic ACUS or ultra high frequency (UHF)/tactical satellite (TACSAT) radios may be the medium for communications. After the aviation unit departs to attack the target, the unit should maintain the capability to communicate directly with a sensor (platform or processing station) for intelligence updates. Additionally, if direct coordination between the aviation brigade and the AAMDC has been authorized, direct communication should be maintained between the aviation brigade and the AAMDC.

5-55. Airspace deconfliction and fire support will support the aviation mission. Fire support assets will plan and execute JSEAD missions to protect the ingress and egress of the aviation elements. In all cases of aviation employment, the DOCC closely monitors attack operations missions until return of all helicopter assets to friendly territory.

5-56. As a matter of standard procedure for all deep operations, crews will video record engagements and forward the videos to higher headquarters for BDA assessments. Aviation units have the capability of providing immediate and accurate BDA on targets engaged. If required, ACE may request a BDA

mission. A re-strike decision is made by the DOCC in accordance with BDA requirements, the target's importance, and BDA results.

5-57. **Special Operation Forces.** If the ARFOR nominated target fits the criteria for a SOF mission profile, it is passed to the Joint Forces Special Operations Component Commander (JFSOCC)/Special Operations Command (SOC) at which time deliberate special operations targeting and mission planning procedures as outlined in JP 3-05.5 will occur. A special operations mission-planning folder (SOMPF) will be developed or updated. The SOMPF will support theater contingency plans on nominated and approved potential targets. These might include factories, warehouses, assembly plants, enemy C^2, or other key nodes in support of TMD operations. The JSOTF will then allocate the SOF assets necessary to service the target. DA missions can be terminal guidance operations (TGO) with fixed or rotary-wing assets, naval gunfire, or FA. Special operations aviation (SOA) may be used or SOF teams may attack TMD infrastructure by themselves or in conjunction with indigenous resistance forces. SR missions may be conducted to pinpoint TELs or to report on LOCs used for transportation of enemy units. SOFs are CINC or JTF assets and require joint level resourcing for logistics, intelligence, and infiltration. Most likely this infiltration follows insertion by JSOTF assets. If SOF is designated to conduct a DA mission and a SOCCE is established for the corps, further actions are coordinated between the DOCC and SOCCE as required.

5-58. **Electronic Warfare.** If EW is the appropriate attack system selected, an intelligence analyst identifies the location of a TM target and frequency(ies) being used by analyzing signal intelligence (SIGINT) sensor data. If the intelligence analyst is at EAC, the target and location are passed to the ACE and DOCC. The DOCC targeting officer confirms the target meets attack criteria. The DOCC determines EW to be the appropriate attack systems to engage the target. The DOCC then routes the EW mission request to the ACE for coordination of the EW mission.

5-59. **Air Interdiction.** If fixed-wing aircraft are the weapon systems selected to conduct TMD air interdiction missions, an intelligence analyst identifies the general location of a stationary or moving TM target by analyzing sensor data. If the intelligence analyst is at EAC, the target and location are passed to the ACE and DOCC. The DOCC targeting officer confirms the target meets attack criteria. The DOCC commander determines that no Army attack operations resources are available for the mission. The DOCC commander then requests support from the JFACC through the BCD or the ASOC. The ASOC supports the corps by coordinating joint air support missions between the JFACC and the Army.

Decentralized Attack Operations Executed

5-60. Responsiveness may be improved by tailoring shorter paths from target acquisition sources through lower level attack C^2 nodes to the attack platform. If the commander desires decentralized execution of high priority, time critical targets, he will designate a subordinate commander (unit) as the execution authority.

5-61. During decentralized execution, sensor systems detect and track targets from launch to hide or reload sites. The tracking operation is monitored by the CGS located at the artillery brigade or battalion. When the target stops moving, the target description and location are passed directly to the artillery battalion TOC. A fire mission is generated by the battalion and passed to the firing unit.

5-62. Decentralized control of fires can also be conducted using artillery-locating radars. These radars will compute a missile or rocket launch location that may be used to engage the target.

5-63. Decentralized execution can provide a streamlined or even a "sensor-to-shooter" mission thread. The advantage is clearly a more rapid capability to engage time-sensitive target (TST) sets. The disadvantage is the limited capability of a brigade or battalion to deconflict a target with other shooters trying to engage it. The other disadvantage is that they also lack the capability to conduct ICAC^2. As a result, it is important that the corps DOCC work closely with the decentralized "executor" of fire missions to ensure ICAC^2 procedures are maintained and to prevent target duplication. However, the disadvantages may be acceptable and decentralized operations appropriate when attacking TSTs that are high enough on the JFC's priority list.

5-64. Decentralized execution of fires must remain within the confines of the commander's intent. Detailed guidance on the HPTL and AGM must answer who, what, where, when, and why of target engagement to ensure target execution supports that intent.

5-65. Selection of other attack operations means (for example, attack helicopters) to perform a hasty attack is also plausible given the availability of that means and direct communication between the attack element and a sensor platform or intelligence processing station for intelligence updates. Other factors (for example, compromising the location of an attack element) may also influence this selection.

5-66. Concurrent with attack operations, execution during this stage includes planning for decisive operations. A deliberate program of operations is planned to provide continuous attack of the enemy's TM systems. Aggressive target acquisition is planned and conducted so that TM systems and support organizations are systematically pursued and destroyed according to the JFC's concept and priorities.

STAGE V—DECISIVE OPERATIONS

5-67. In operations involving combat, the JFC will decide at some point to move against the enemy. This point may be predetermined and stated in the campaign plan, or it may be tied to specific enemy actions.

PLANNING

5-68. In order to paralyze the enemy and rapidly gain the initiative for friendly forces, commanders normally seek to engage enemy forces simultaneously throughout the depth and space of the AO. Therefore, attack

operations-capable units should continue to plan for and execute TMD attack operations while simultaneously supporting the close battle.

EXECUTION

5-69. Overall TMD operations may vary during different phases of operations depending upon enemy TM activities. However, TMD attack operations execution during decisive operations remains essentially as described in deployment and entry operations.

STAGES VI AND VII—REDEPLOYMENT AND POST CONFLICT

5-70. Having recovered (if required) to a previously attained high state of readiness, attack operations elements (FA, aviation, and SOF) continue their missions in accordance with original or revised ROE. SOF usually exfiltrate unilaterally upon completion of the mission. Attack operations-capable units plan redeployment. Attack operations-capable units redeploy and reconstitute to achieve readiness status.

STAGE VIII—DEMOBILIZATION

5-71. Units submit TMD attack operations lessons learned to higher headquarters and resume training. Should hostilities resume, attack operations-capable units may be required to execute TMD attack operations.

Chapter 6

Active Defense

This chapter addresses Army TMD active defense at the ARFOR and corps level. Active defense operations defend the force and selected geopolitical assets from TM attack; including attacks from TBMs, ASMs, and CMs as well as aircraft capable of carrying ASMs and CMs. Army active defense normally consists of multitiered ADA weapon systems.

To create a coherent Army TMD, active defense operations must complement passive defense, attack operations, and C^4I. Effective active defense requires close coordination between all Army, joint, and multinational organizations and the integration of weapon systems conducting joint TMD.

GENERAL

6-1. Effective active defense requires the contributions of air, land, sea, space, and SOF of all service components and supporting CINCs. Army active defense must be synchronized throughout all dimensions of the battle space and support overall force objectives. Active defense helps ensure that combined arms elements retain freedom to maneuver. It ensures combat support (CS) and CSS units can continue to conduct support and sustainment operations throughout the theater without interruption by TM attacks.

6-2. Continuous surveillance to detect missile launch is required. A confirmed launch triggers reaction by a preplanned composition of appropriate defensive systems, according to established ROE. Potentially short duration missile flight times require that all applicable air, land, sea and space-based sensor and surveillance assets be linked together to provide a complete and current air picture for total situational awareness. Effective destruction of enemy TMs in flight reduces enemy confidence in TM employment against friendly forces and provides force protection.

6-3. Army active defense includes contributions from theater, corps, and divisional ADA units. These units are employed in a multitiered defense consisting of all ADA systems. The actual composition will vary based on METT-TC. In a littoral environment, naval and marine forces will contribute as part of the multitiered defense during joint force projection operations. Active defense operations are decentrally executed according to Army and joint doctrine, procedures, and applicable ROE. Active defense systems engage enemy TMs at maximum range and altitude to reduce damage to defended critical assets and areas.

6-4. Army active defense units under JFC are under OPCON of the ARFOR Commander who employs these units within his AO under JFC-approved

weapons control procedures and measures established by the AADC. The ARFOR Commander allocates units to theater and corps organizations to optimize protection of the active defense priorities and to support the attainment of operational ground objectives (see JP 3-01.5).

6-5. Active defense, as part of Army TMD operations, integrates all the contributions of other combined arms elements. Combined arms elements may participate in active defense through engagements of short-range TM carriers and CMs operating at low altitude.

OPERATIONAL FORCE PROTECTION

6-6. Operational protection conserves the fighting potential of a force so that it can be applied at the decisive time and place. Operational protection includes actions taken to counter enemy firepower and maneuver by making soldiers, systems, and friendly formations difficult to detect, strike, and destroy. Operational protection pertains to forces throughout the theater and includes, but is not limited to, providing operational air and missile defense (theater and maneuver force protection).

6-7. All members of the joint and multinational force perform air defense operations; however, ground-based air and missile defense units (joint and multinational) currently conduct the bulk of the active defense mission. Army ADA provides protection to forces and selected geopolitical assets from aerial attack, missile attack, and surveillance. Significant considerations for employment of ADA in theater operations include its role in joint and multinational active air and missile defense operations, the threat, number of assets to be defended, and available forces. Commanders must establish priorities for active defense. Risk must be accepted for lower priority assets, which may not be directly defended or are allocated less protection.

ACTIVE DEFENSE ORGANIZATION

6-8. The organizations that execute Army active defense span all three levels of war. These levels are strategic, operational, and tactical.

6-9. The AMDCOORD coordinates with the ADA elements at higher and lower echelons, as well as with adjacent ADA units. Coordination ensures vertical and horizontal integration of air defense and active defense protection throughout the battlefield. For example, the corps AMDCOORD integrates corps ADA with theater, division, and adjacent corps ADA forces. In force projection operations, this may include integration with joint and multinational active air defense and TMD participants in coordination with the TAAMDCOORD.

ARMY AIR AND MISSILE DEFENSE COMMAND

6-10. The AAMDC Commander commands the Army's EAC air and missile defense forces, writes the air and missile defense annex for the ARFOR OPLAN/OPORD, and ensures all Army active defense requirements are coordinated and integrated not only within the ARFOR, but also within joint and multinational operations. The AAMDC provides a single point of contact to the ARFOR and for joint and multinational staffs for Army TMD

operations across the full spectrum of the TMD operational elements (active defense, passive defense, attack operations, and C4I). The AAMDC Commander executes TMD operations for the ARFOR Commander. The AAMDC Commander may also be designated the DAADC, which formalizes the relationship between ground-based air defense assets dedicated to theater-level missions and the AADC. This designation also ensures fully integrated and synchronized air defense and joint TMD operations.

6-11. The AAMDC Commander has total responsibility for executing Army active defense operations within the ARFOR AO. These responsibilities include recommending active defense missions for other members of the multinational and combined arms team and integration with the AADC and other components. The commander ensures that organic, assigned, and supporting ADA units accomplish active defense objectives in support of the ARFOR Commander's concept of operations and the CINC's DAL.

ARMY FORCES THEATER AIR AND MISSILE DEFENSE CELL/AIR DEFENSE ELEMENT

6-12. The ARFOR TAMD Cell/ADE is a staff element that works for the ARFOR G3. The TAMD Cell/ADE performs TAMD staff work on a daily basis. During contingency operations the TAMD Cell/ADE plans and coordinates TAMD operations for the ARFOR and prepares for the reception of the AAMDC into theater. Once deployed, the AAMDC assumes the functions of the ARFOR TAMD Cell, and the TAMD Cell serves as the AAMDC's liaison to the ARFOR Commander.

ARMY AIR AND MISSILE DEFENSE COORDINATOR

6-13. The AMDCOORD is an integral member of ARFOR staff planning teams. The senior ADA commander at each level in the ARFOR organization normally performs AMDCOORD functions. The AMDCOORD recommends active defense priorities consistent with the factors of METT-TC. The AMDCOORD develops these priorities based on CVRT factors of each asset. The AMDCOORD recommends ADA and other combined arms active defense measures in the active defense estimates. After staff coordination and approval of active defense estimates, the AMDCOORD develops the active defense portion of the air and missile defense annex to the ARFOR OPLAN. The AMDCOORD also assists in integrating TMD priorities into the force's targeting process.

6-14. The AAMDC Commander is the TAAMDCOORD and the AMDCOORD to the ARFOR Commander. The TAAMDCOORD integrates with active defense operations and planning at the Army service component level. The TAAMDCOORD is the ARFOR Commander representative for active defense planning and coordination with the JFACC, ACA, and AADC. The TAAMDCOORD prepares the active defense appendix to the air and missile defense annex for the ARFOR OPLAN. In addition, the TAAMDCOORD ensures the corps active defense requirements are integrated into active air defense and TMD planning.

EAC ADA BRIGADES

6-15. EAC ADA brigades will deploy early into theater to protect APODs, SPODs, early arriving forces, and critical supplies. As the lodgment is expanded, critical political, communications, transportation, and military forces will be protected. As deployment operations conclude, EAC ADA brigades and multinational forces will form a cohesive integrated defense from which to conduct military operations.

6-16. Units conducting active defense at theater level normally consist of one or more EAC ADA brigades that provide C^2 over assigned forces. The brigade commander task organizes active defense resources to protect selected priority assets designated by the AAMDC Commander from the DAL.

CORPS ADA UNITS

6-17. Units conducting active defense at corps level normally consist of an ADA brigade that provides C^2 over assigned forces and focuses on force operations. The corps ADA brigade task organizes ADA resources to protect the corps commander's priorities. The corps ADA brigade closely coordinates with the AAMDC, Sector Air Defense Commander (SADC) or Regional Air Defense Commander (RADC), corps and division TOCs, and adjacent ADA brigades as well as with subordinate ADA battalions.

6-18. Corps ADA brigades will deploy into theater and likely assist in protecting theater assets during entry operations. Once the lodgment is expanded, corps active defense assets will shift as the corps commander's priorities shift. Priorities could include C^4I, corps reserves, logistic sites, and maneuver forces.

DIVISION ADA UNITS

6-19. The first Army active defense forces to enter an unsecured lodgment may be the short-range air defense (SHORAD) batteries and battalions assigned to the divisions conducting the entry. Early deployment of AN/MPQ-64 Sentinel radar and the Forward Area Air Defense Command and Control ($FAADC^2$) may be required for early warning and linkage with SHORAD weapons and joint active defense forces. The SHORAD battalions contribute to TMD active defense by protecting the force from surveillance by UAVs and attack by CMs or fixed-wing aircraft carrying ASMs.

FORCE PROJECTION PLANNING

6-20. Early planning for active defense occurs prior to mobilization. Joint CONPLANs are evaluated to ensure understanding, to assess the need for additional force tailoring requirements, to develop a more complete mission breakdown for subordinate units, and to provide a more detailed mission support analysis. Information provided to active defense-capable units includes a general mission statement, priorities, and probable force package.

6-21. The TAAMDCOORD/AMDCOORD evaluates threat capabilities, recommends general force and critical asset protection priorities, and recommends TPFDD priorities for assigned units that will conduct active defense. Specific attention must be given to the need to provide an adequate

number of missiles to match the threat. Missile firing rates may dictate the need to increase the TPFDL priority of selected missiles.

6-22. The AAMDC plans and coordinates for active defense operations and evaluates sustainment needs to support those operations. The AAMDC assists subordinate units in the planning for active defense operations.

STAGES I AND II—MOBILIZATION AND PREDEPLOYMENT

6-23. Once force projection operations move into the mobilization and predeployment stages, active defense-capable units focus planning and coordinating efforts on preparing OPLANs and OPORDs for the given theater and operation. They must also make every effort to integrate the capabilities of the deploying forces with those of joint, multinational, and forward-deployed forces.

PLANNING

6-24. The AAMDC plans and coordinates with all staff elements to provide active defense recommendations to the ARFOR Commander concerning active defense plans, force, and critical asset protection priorities and TPFDD priorities. The TAAMDCOORD/DAADC coordinates and integrates those joint active defense requirements that ensure Army active defense can be conducted as effectively as possible. This includes coordinating joint ROE and overall active defense plans with each echelon, as appropriate. Commanders may use automated defense planning functions to conduct initial active defense design planning, along with IPB information, to develop possible friendly and threat COA. The COAs may serve to fine-tune the task organization. Active defense unit commanders develop TMD priorities based on the factors of CVRT. The following are considerations for deploying and employing active defense units against TMs. These considerations cover the spectrum of TM delivery methods and procedures. When active defense forces are providing asset protection, the commander must establish appropriate states of readiness (SOR) and states of emission control (SOE) in accordance with the current theater operating procedures, the current tactical situation, METT-TC, and directives from higher headquarters. This includes coordinating joint ROE and overall active defense plans with each echelon, as appropriate. In addition, the DAADC may chair periodic active defense Reprioritization Boards comprised of representatives from all joint service components. These boards serve as a means to synchronize friendly active defense efforts, update TMD planning in response to enemy actions, and ensure compliance with JFC-established priorities.

Defense Against Theater Ballistic Missiles

6-25. When creating a defense design against TBMs, detailed planning is centralized usually at battalion or brigade level. Units should plan to fight against the most stressing TBMs in the threat arsenal using mutual support and overlapping coverage in accordance with ADA guidelines. A mix of complementary active defense systems must be employed to effectively counter the TBM threat to rear areas during early entry and follow-on operations. This mix will consist of an upper tier system and one or more lower tier systems. Both upper and lower tier systems must be capable of

accurately classifying TBMs so that fires can be prioritized against the incoming targets.

6-26. TBM engagement opportunities are measured in seconds due to the flight trajectories and extremely high speeds that TBMs attain. The shorter acquisition and detection time window for TBMs directly impacts early warning and reaction to defeat the TBM threat. Warning information and predicted impact points must be transmitted as quickly as possible throughout the theater of operations, especially if WMD/WME are suspected. Decentralized control for engagements is imperative to counter the TBM threat since reaction time is critically short. TBMs launched against friendly forces or assets typically fly extremely steep trajectories from enemy positions, classifying them as TBMs.

Defense Against Cruise Missiles

6-27. When CMs are a primary threat, a mix of high to medium altitude defense (HIMAD) and SHORAD systems provides primary protection. CMs may be misidentified as aircraft due to their similar flight characteristics and will be further identified based on compliance with the airspace control plan. As technology enables accurate target classification as manned or unmanned, future doctrine and established ROE may allow for the authority to engage on classification as an unmanned platform. Such a procedure will allow preferential engagement of CMs and UAVs, destroying them at ranges and locations that minimize lethal effects on friendly forces.

Defense Against Air-To-Surface Missiles

6-28. Active defense units may detect firing and separation of an ASM from a carrier and classify the track based on velocity profiles. Active defense-capable units should be linked to joint intelligence networks, which provide warning of ASM launches and assist in cueing for engagement by appropriate active defense units. They may also receive ASM intelligence data on real-time tracks.

Defense Against Airborne Missile Carriers

6-29. TM carriers are indistinguishable from other manned aircraft to organic sensors supporting active defense. Active defense-capable units must be provided warning via data links from joint intelligence sources to distinguish between TM carriers and other manned aircraft threats. Depending on the TM carrier's arsenal, TMD forces should conduct long-range engagements before the carrier can launch a TM. Engaging the carrier has operational advantages over delaying engagement and attempting to engage multiple TMs after they are launched.

6-30. The nature of aircraft flight parameters such as altitude, human (pilot) limitations, time of flight, distance from targets, and the increased exposure to weapon systems over time provides a greater opportunity for engagement by friendly forces. If a thorough IPB is conducted, properly positioned sensors may provide longer acquisition and detection time windows on targets as they approach friendly battlespace. This facilitates warning and updating of target information for dissemination to theater forces.

EXECUTION

6-31. During the mobilization and predeployment stages, commanders task organize assigned units. Commanders assess the factors of METT-TC, the force commander's intent, the IPB, and the approved air and missile defense priorities to determine the composition of active defense forces necessary to protect those priorities.

STAGES III AND VI—DEPLOYMENT AND ENTRY OPERATIONS

6-32. Following predeployment plans, commanders execute movement of assigned units to deployment sites and continue training. Once alerted to move, units will deploy to the theater as directed.

PLANNING

6-33. Active defense operations during these stages are essential due to the potential vulnerability of deploying forces. TM attacks can come from almost any direction and fire units must be ready to counter threat TM attacks immediately on arrival in theater. As in-theater intelligence becomes available, estimates of TM order of battle and active defense plans are adjusted. Commanders and staffs continuously adjust their plans for anticipated forced entry operations, planned C^2 structures, knowledge of participating joint and multinational organization, disposition of any in-place host nation forces and revisions to debarkation sequences as changes impact active defense operations. A key constraint in active defense planning may be the availability of TM interceptor missiles for basic loads and resupply.

6-34. Each entry operation will be different. Entry may be either opposed or unopposed by TMs. Host nation and forward deployed active defense forces will support entry operations. Forces are most vulnerable to TMs, and the success of the operation is at greatest risk during initial entry. This vulnerability is most acute when the threat possesses TMs with WMD/WME. Protecting geopolitical assets from TM attacks will also be vital to the resolve, will, and morale of multinational forces and nations.

EXECUTION

6-35. Active defense provides a measure of security, without overt hostile or aggressive action. In many cases this may be more desirable than proactive attack operations during deployment and entry stages.

6-36. Upon arrival in theater, the AAMDC will immediately establish connectivity to allow coordination with all Army, joint, host nation, and multinational forces in theater conducting TMD. The AAMDC Commander will command EAC active defense forces for the ARFOR Commander as an integral part of TMD operations. The AAMDC oversees the conduct of TMD for the ARFOR. Early entry of C^2 elements is essential for management of active defense operations, communications, and coordination with Army and joint surveillance systems and integration of Army active defense within the theater air defense structure.

6-37. The establishment of connectivity between deploying active defense units and joint forces already conducting in-theater active defense is a

priority. If the lodgment is secure, commanders should consider deploying TMD elements early to provide greater TM protection. These units protect the APOD/SPODs and the early entry force. FAADC[2] systems should be deployed early, if the ASM or CM threat is high, to provide a link with joint active defense and surveillance systems for alerting and cueing.

6-38. The active defense unit's concept of operations must provide for mission success and maximize future employment options. The defense design must grow in logical synchronization with the deployment flow of units and the expansion of the lodgment. As additional forces and the remainder of the corps and EAC active defense-capable units deploy and arrive in the lodgment, primary responsibility for protection of theater assets will likely fall to one or more EAC ADA units. The AAMDC will interface with the major subordinate elements of the service or functional component commanders, AADC, and the ACA.

STAGE V—DECISIVE OPERATIONS

6-39. Active defense procedures for the decisive operations stage are in general a continuation of those used during entry operations. EAC ADA brigades conduct active defense to protect the theater base so it can support and sustain corps and division operations. EAC active defense design may shift according to ARFOR plans to support corps operations. Forces conducting active defense at corps and below support their maneuver commander's scheme of maneuver by protecting the force and critical asset priorities. EAC and corps brigade commanders may reorganize task force configurations and active defense designs based on JFC guidance to provide as much protection as possible to ensure the force can attain its operational objectives.

PLANNING

6-40. The AAMDC coordinates active defense with attack operations and passive defense at both Army and joint levels. The AAMDC continues to coordinate and deconflict changes to support the ARFOR concept of operations and monitors operations.

6-41. AMDCOORDs provide the ARFOR Commander and corps commanders with active defense expertise, making recommendations for improving protection and better supporting the operational concept. AMDCOORDs should also plan and coordinate for the continuation of active defense after operations cease.

6-42. The EAC and corps active defense units continue to concentrate on force operations. Commanders, as necessary, will adjust the prioritized assets to be defended by each task force. External communications and interconnections are adjusted as defense designs and priorities change.

EXECUTION

6-43. Execution of active defense operations will probably not change once the operations stage begins. The AAMDC monitors the air picture, active defense unit locations and status, and engagement operations.

STAGES VI AND VII—REDEPLOYMENT AND POST CONFLICT

6-44. While other forces may begin preparing for redeployment, restoring order, or reestablishing the host nation infrastructure, units conducting active defense must remain vigilant against isolated TM attacks or a full resumption of hostilities. Simultaneously continuing to conduct active defense, commanders and units should begin planning for redeployment and reconstitution of units. Effective active defense provides protection of the force and critical assets as they secure and consolidate objectives and recover from operations. Units must rapidly consolidate, reconstitute, and prepare to remain in theater as long as needed. EAC and corps active defense forces shift defense designs according to JFC guidance and ARFOR plans to support post conflict operations. The AMDCOORDs recommend priorities to the supported commanders just as in the operations stage. Active defense is planned and executed, as required, consistent with these priorities. With the exception of operating under revised (possibly more stringent) ROE, active defense redeployment operations are similar to entry and operations stages.

STAGE VIII—DEMOBILIZATION

6-45. Active defense-capable units continue to protect the force during demobilization. This protection is as critical during demobilization as it is during any other stage of the operation. While the most significant TM capabilities should have been eliminated, units conducting active defense must be prepared to counter desperation or retaliatory attacks. Therefore, active defense units may be among the last to leave theater, or may remain indefinitely in support of JFC SASO. EAC and corps ADA units shift defense design according to JFC guidance and ARFOR plans to support this stage. Defense of APODs, SPODs, staging areas, and critical host nation facilities is usually the highest priority. Defense of geopolitical assets may also continue to be an on-going priority.

Chapter 7

Passive Defense

This chapter describes TMD passive defense measures used by US forces to minimize casualties, preserve OPTEMPO, and restore combat power. Passive defense measures used by ARFOR include reducing force vulnerability, reducing the effectiveness of threat targeting, providing tactical warning to the force, and facilitating force recovery and reconstitution.

GENERAL

7-1. TMD passive defense consists of those measures initiated to reduce vulnerability and to minimize the effects of damage caused by TM attacks. Passive defense measures must be trained and implemented at all Army levels. Commanders employ four principal passive defense measures to improve TMD. These measures are:

- Reducing force vulnerability.
- Reducing the effectiveness of threat targeting.
- Providing tactical warning to the force.
- Facilitating force recovery and reconstitution.

PASSIVE MEASURES

7-2. TMD passive defense measures provide individual and collective protection of friendly forces, population centers, and critical assets. US forces must implement TMD passive defense measures whenever and wherever they face a TM threat. Planning for passive defense begins with a comprehensive TMD IPB. This IPB then provides a methodology to evaluate the impact of TM employment. Army TMD planners should formulate guidance to subordinate headquarters and allocate resources to support passive defense operations (see JP 3-01.5).

REDUCING VULNERABILITY

7-3. Reducing vulnerability involves all measures taken to ensure that friendly personnel and equipment survive a TM attack with minimal casualties and damage. This principle is accomplished through hardening, redundancy, robustness, dispersal, training civil authorities, and NBC protection (see Figure 7-1, page 7-2).

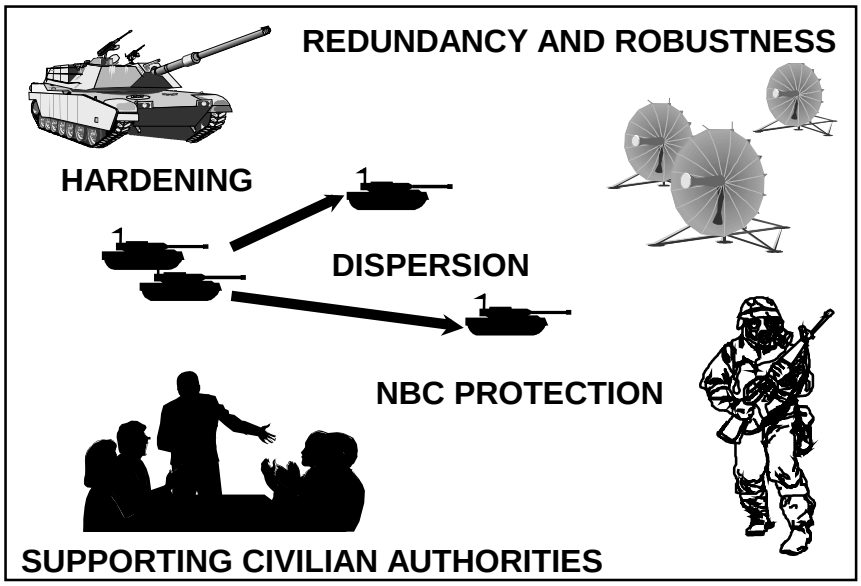

Figure 7-1. Reducing Vulnerability

Hardening

7-4. Hardening reduces the effect of attack on systems, facilities, and organizations. Design, careful site selection, field fortification, and other field expedient methods can accomplish hardening. Hardening begins in peacetime and continues throughout operations.

7-5. Prior to deployment, staffs will plan for the need to build field fortifications and improve the NBC hardening characteristics of structures and systems. Most system NBC hardening will be accomplished prior to deployment as a part of system design or as an add-on capability. Other equipment improvements such as armor protection for vehicles and body armor for soldiers should be made prior to deployment too, while on-site fortification work may become part of early entry operations.

7-6. Field fortifications and NBC hardening of structures and systems are important during all operations, especially during early entry. NBC collective protection systems and field expedient methods are also available to improve the NBC protection of existing structures in the AO.

7-7. Engineer elements must establish measures to minimize the physical blast, thermal, and radiation effects caused by nuclear-capable TMs. Planning maximizes our ability to provide the desired level of protection. The integration of camouflage and concealment plans also adds to the overall effectiveness of hardening. The type of protection must be determined based on the enemy's WMD/WME capabilities and probable means of delivery. Also exposure, vulnerability to discovery, location, mobility, surrounding terrain, and ability to avoid detection must be considered when establishing engineer support priorities. Protection may include parapets, revetments, earth walls, or dug-in positions. Adding timber or steel-reinforced concrete can also enhance existing defensive positions.

Redundancy and Robustness

7-8. Redundancy and robustness preserve combat power by duplication of critical capabilities that are particularly vulnerable to TM attack and for which other passive measures may be less appropriate. Force commanders should strive to minimize single point failures in key operational systems. Soft targets such as C^2 nodes, sensors, and fixed sites are of particular concern.

Dispersal

7-9. Dispersal reduces target vulnerability by decreasing concentration and making a target less lucrative. Combined with mobility and deception, dispersal increases enemy uncertainty as to whether a particular location is occupied. It forces the enemy to search more locations, requiring more resources and more time. It also minimizes the effect of TM use by forcing the enemy to use a limited resource against targets of much lesser value.

7-10. The force commander will plan to take maximum advantage of the significant improvements in C^3 systems to spread out friendly assets. Dispersal will reduce force vulnerability to TM effects, especially their potential for producing mass casualties. This may be difficult to accomplish during entry operations, especially in the case of forced entry when the initial lodgment area is small. Dispersal will contribute to the unit survival during a TM attack, but makes it more vulnerable to ground attack. Commanders will need to make appropriate trade-offs.

Training Civil Authorities

7-11. The force commander may be required to train and equip civilian defense authorities for passive defense suject to applicable statute and regulation. Measures can include establishing air and missile defense warning systems, identifying protected areas to go to in case of attack, providing protective measures to be taken by civilians using self-help techniques, and specifying the use of individual protective equipment.

7-12. Civilian authorities should be trained to organize and instruct their populations on actions to take upon warning of missile attack. Means of distributing early warning should be rehearsed. Populations in areas at risk of TM attack should frequently rehearse the entire process, from early warning through occupation of protective shelters. This training will facilitate civil defense efforts and may reduce the political impact of missiles and engagement debris hitting civilian areas and facilities. Also, civilian populations will be less likely to panic when “missile alerts” have been rehearsed.

NBC Protection

7-13. NBC defense is critical whenever the enemy has the capability to employ WMD/WME. The elements of passive defense against NBC weapons are contamination avoidance, force protection, and decontamination.

7-14. NBC protection includes actions taken to physically counter the effects of the threat’s WMD/WME TM delivery capability and maintain the health and morale of soldiers. Based on METT-TC, NBC protective measures should

be implemented prior to force projection operations or at any point in an operation. The purpose of implementing NBC protective measures is to minimize WMD/WME impacts on the tempo and operations while protecting personnel and equipment. A warned force may be able to improve its protective posture by taking cover or donning protective gear. While these actions will provide force protection, this protection must be weighed against their potential for mission degradation. NBC protection is divided into three broad areas:

- *Force protection*. Force protection involves actions taken to reduce the vulnerability of the force to WMD/WME attacks. Success depends largely on the operational employment of NBC detectors and sensors with organic capabilities and from specialized NBC reconnaissance assets.
- *Collective protection*. Collective protection provides a contamination-free environment for selected portions of the force by applying special filtration systems to vehicles and shelters. Collective protection is especially valuable because it avoids the psychological and physiological burden of individual protection.
- *Individual protection*. Individual protection is largely accomplished using individual chemical protective equipment and pre/post attack medical prophylaxis taken to reduce the body's susceptibility to specific classes of chemical or biological agents.

REDUCE TARGETING EFFECTIVENESS

7-15. Commanders use OPSEC, deception, mobility, camouflage and concealment, and improved battle command measures to reduce the effectiveness of threat targeting against US interests. These measures are intended to make the enemy's targeting effectiveness of friendly assets as difficult as possible. Commanders will determine the extent of measures taken to reduce targeting effectiveness based on proximity to the enemy, assigned mission, and the enemy's capabilities to collect information on friendly operations (see Figure 7-2).

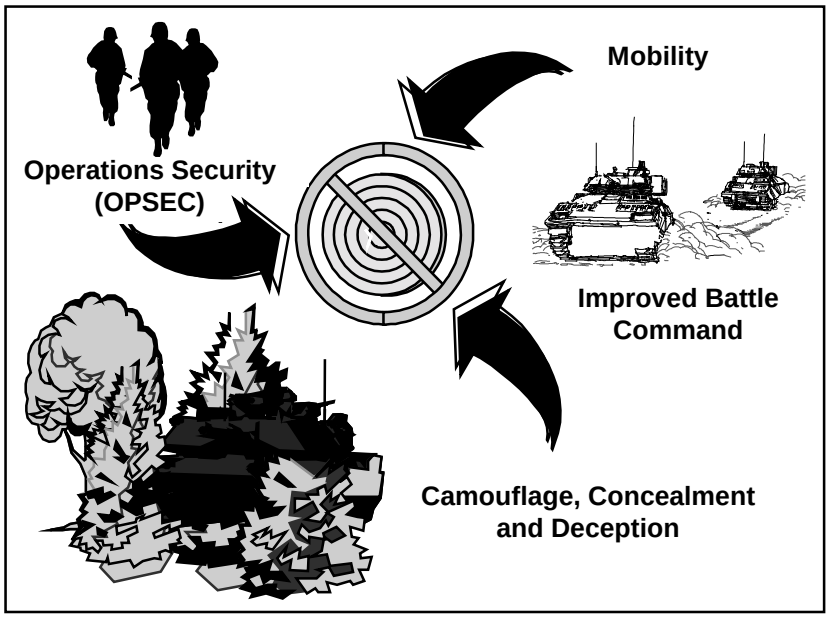

Figure 7-2. Reducing Targeting Effectiveness

Operations Security

7-16. OPSEC are measures taken to maintain security and achieve tactical surprise. It includes signal security, signature reduction, physical security, and information security. It also involves the identification and elimination or control of indicators, which can be exploited by hostile intelligence organizations.

7-17. **Signal Security.** Signal security is accomplished using a variety of techniques. These include minimizing transmission time, minimizing transmission power, using remote antennas, using directional antennas, using wire or fiber optic land lines, and using line of sight systems.

7-18. **Signature Reduction.** Signature reduction includes passive defense measures to deny targeting data to the enemy such as camouflage, noise reduction, heat reduction, electromagnetic signals reduction, radar absorbing camouflage, and concealment devices. Signature reduction also employs active signature masking measures including the use of smoke and obscurants. Appropriate EMCON procedures are used to control transmitting devices (radars, radios, data links, et cetera) that could possibly provide the enemy information as to location, type, and characteristics of friendly units and devices. SOE are control measures used particularly with radars to control time of transmission, type of transmission, and direction of transmission to prevent targeting by enemy assets.

7-19. **Physical and Information Security.** Physical security measures include safeguarding of personnel, military equipment and facilities, medical material, and arms and ammunition. Information security is the safeguarding of all media, access to which would allow the enemy to gain an advantage over friendly forces.

Deception

7-20. Deception is designed to mislead the enemy by manipulation, distortion, or falsification of evidence to induce the enemy to react in a manner prejudicial to his intentions. Successful deception in TMD requires a good deception plan that is executed correctly, monitored constantly, modified as necessary, and deceives the enemy completely. Deception in TMD is best categorized as being either ambiguous or misdirecting. Ambiguous deception will increase confusion in the enemy's IPB process and lower the probability of effectively targeting US forces by adding to the alternatives from which it must base targeting decisions. Misdirection reduces the uncertainty in the enemy's IPB process by convincing it of a particular falsehood, thereby influencing targeting decision(s) by having it commit TMs prematurely or ineffectively.

Mobility

7-21. Mobility is the quality or capability of military forces, which permits them to move from place to place while retaining the ability to perform their primary mission. Mobility includes all those measures taken to ensure high-value elements of the force are never stationary long enough to provide an effective and lucrative TM target. Theater and operational level staffs will attempt to incorporate as much mobility as possible into all operations. Mobility increases the difficulty of the enemy's targeting process. Frequent displacement or continuous movement of key assets makes them less likely to be targeted.

Camouflage and Concealment

7-22. Camouflage and concealment are important parts of TMD during operations. They help counter the enemy's TM targeting effectiveness by making soldiers, units, vehicles, aircraft, weapons, tactical positions, and installations difficult to locate, strike, and destroy. Camouflage and concealment complicate the enemy's reconnaissance and target acquisition process for both visual observations and multi-spectral sensor systems. When coupled with deception, camouflage and concealment protect the force from TMs by manipulating the enemy's TM targeting decisions.

7-23. The purpose of camouflage and concealment in TMD is to avoid detection altogether. In some cases, it may succeed by merely preventing the enemy from clearly identifying a TM target. Camouflage discipline is critical to camouflage success. A comprehensive camouflage standard operating procedure (SOP) is a good tool for prescribing and enforcing standards that promote camouflage discipline. Concealment is protection from observation and surveillance. There are four methods of concealment: hiding, blending, disrupting, and disguising. They are most effective when used together. Visual concealment is seldom enough. Concealment must consider the enemy's ability to conduct multi-spectral reconnaissance. Smoke and obscurants can augment concealment and may be used with the following concealment methods; hiding with small screens, blending with large area visual screens and heat-signature screens, and employing smoke as a disguise with deceptive measures using high-fidelity decoys. SIGINT can eliminate or reduce the effectiveness of the enemy's TM target acquisition systems.

TACTICAL WARNING OF THE FORCE

7-24. Theater commanders are responsible for establishing reporting systems to acquire, process, and disseminate warning information to joint force components and population centers. They are also responsible for implementing the TMD architecture for local operations and intelligence networks. The CINC tactical warning requirements are supported by national and theater systems. Component commanders are responsible for providing warning to assigned forces. Tactical warnings initiate preplanned passive defense actions. Warnings are both general (that missile launches are imminent or have occurred) and specific (that specific units or areas are under attack) (see Figure 7-3).

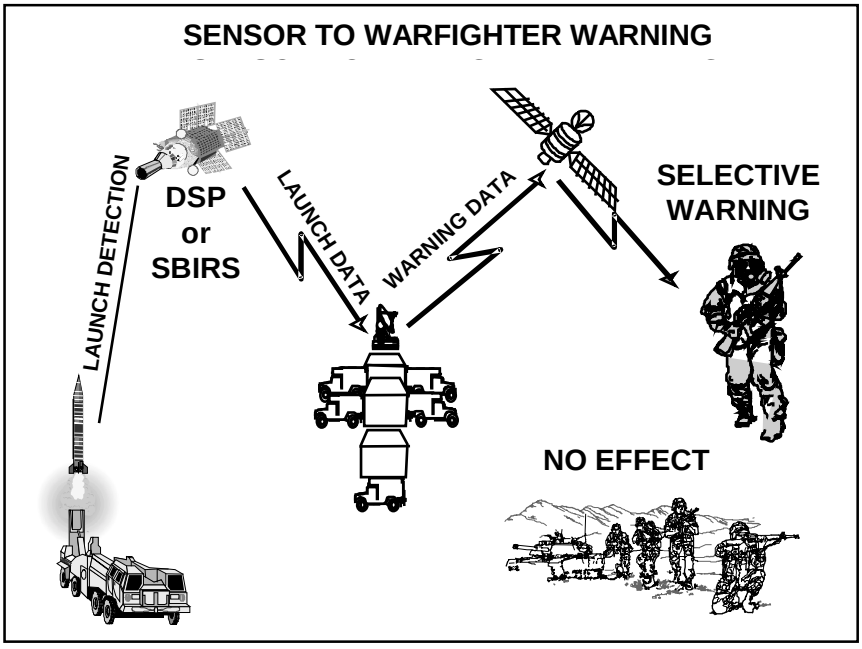

Figure 7-3. Warning the Force

PLANNING UNIT RECOVERY AND RECONSTITUTION

7-25. Following a TM attack, units will be restored to a desired level of combat effectiveness, commensurate with mission requirements and available resources. In instances of mass devastation, whole unit replacement may be necessary (see Figure 7-4, page 7-8).

RESTORE FORCE EFFECTIVENESS CONTINUOUS PROCESS FOCUSES ON WMD CASUALTY POTENTIAL	
RECOVERY • Conduct decontamination • Reestablish C^2 • Replace lost soldiers and equipment ***LEAST TIME CONSUMING***	**RECONSTITUTION** • Ad hoc assessment team • Reorganization • Regeneration ***MOST TIME CONSUMING***

Figure 7-4. Recovery and Reconstitution

PASSIVE DEFENSE ORGANIZATION

7-26. Commanders at all echelons are responsible for planning and executing passive defense measures to protect their units, and component commanders are responsible for implementing effective procedures to provide warning to all assigned forces. Key players in the passive defense element of Army TMD operations must ensure that passive defense measures are integrated into joint systems and operations. Synchronization is essential to ensure the proper forces are warned and protected.

7-27. The ARFOR Commander has the responsibility of providing warning to assigned forces vulnerable to missile attack. Passive defense capabilities and operations must be coordinated with other services to ensure seamless and effective warning, protection, and response to the effects of a TM attack. Efforts to deal with the effects of WMD/WME TMs necessitate coordinated efforts for support such as NBC detection and decontamination.

7-28. Passive defense resources include NBC, engineer, medical, signal, intelligence, ADA, and CSS personnel and assets. In addition, every unit has passive defense capabilities that can be used to enhanced survivability.

NUCLEAR, BIOLOGICAL, AND CHEMICAL ELEMENTS

7-29. NBC defense systems include reconnaissance, detection, decontamination, and information systems. Chemical Corps contributions are principally NBC defense and TMD passive defense staff planning and execution.

ENGINEER ELEMENTS

7-30. Engineer passive defense contributions include mobility (gap and obstacle breaching), survivability (field fortification, construction, and concealment), sustainment engineering (building and repairing lines of communication and facilities), and topographic engineering (terrain analysis products).

MEDICAL ELEMENTS

7-31. Medical passive defense contributions include biological defense, medical chemical defense, and combat casualty care. Biological defense goals include preventing casualties by the use of biological countermeasures,

diagnosing biological warfare agent exposure quickly, and by using antibodies/antitoxins to prevent lethality and maximize return to duty capabilities. Medical chemical defense goals are preventing casualties by the use of chemical countermeasures, providing individual prevention and prophylaxis, and management of chemical casualties to maximize return to duty. Combat casualty care attempts to save lives as far forward in the battle area as possible.

SIGNAL ELEMENTS

7-32. Signal Corps contributions to passive defense lie mainly in the communications and position location area. Survivable, redundant communications that are not easily targeted or identified contribute to passive defene.

INTELLIGENCE ELEMENTS

7-33. Intelligence assets include national and military resources. These types of agencies provide the theater commander intelligence concerning enemy intent, capabilities, and locations through the use of various sources of information.

AIR DEFENSE ELEMENTS

7-34. Passive air defense improves survivability by reducing the likelihood of being detected and targeted from the air and by mitigating the potential effects of air surveillance and attack. It does not involve the employment of lethal weapons. Air defense actions include providing alert and early warning systems, reactive TMD protection and overwatch, comprehensive EMCON policy, and communications to sensor systems.

COMBAT SERVICE SUPPORT ELEMENTS

7-35. CSS is critical for the success of passive defense operations. CSS units perform the following functions: supply, maintenance, transportation, combat health support, personnel support, and field services. CSS planners must be involved in deception planning since CSS units may need to use deception means to lead the enemy to believe activities exist where there are none. For example, they may use logistics base decoy packages, set up fake supply routes to a dummy base, or use smoke to simulate activity or obscure a dummy base. The technique of mobility clearly depends to some extent on availability of transportation assets beyond a unit's internal capability. Camouflage/concealment has significant implications for CSS units. They may store supplies in factories, bunkers, tunnels, et cetera. They set up in unusual positions, use secondary routes, move randomly, set up activities in partially destroyed installations, and so on. In addition, resupply of appropriate materiel is a key component of camouflage as well as hardening activities.

WARNING

7-36. National and in-theater systems have the capability to detect BM launch and predict where and when they will impact. In-theater systems also

can detect CMs and ASMs. CM impact points are difficult to determine accurately. ASM impact points may be predicted, but reaction time will be minimal. The challenge of early warning is to process information obtained from these sensors and disseminate timely TM warnings to personnel within the area at risk. Ideally, personnel outside the area at risk continue to perform under normal conditions. Once an enemy TM launch is detected, friendly forces will have little time to disseminate early warning to those forces or assets threatened by the TM. Warning architectures must be designed to support rapid distribution of warning through multiple and redundant routes. It is the CINC's and the ARFOR Commander's responsibility to establish the C^4I systems to support distribution of passive defense information throughout the theater.

7-37. The ability to warn friendly forces of enemy TM attack is conducted in two stages. The first stage is alert warning and the second is impact warning. Alert warning is a data broadcast in near real-time over TIBS or TDDS followed by a voice warning broadcast over theater voice networks. For example, "a TBM missile launch has been detected" voice and data TM early warning is broadcast over Army command, TM early warning nets, and Global Command and Control System (GCCS). This warning may also be used to update information on location predicted impact point.

7-38. Force warning is soldier intensive. Lower echelon units will require more time to disseminate a warning because many automated systems currently terminate at battalion level. For this reason, force-warning procedures must decrease the amount of time necessary to issue warnings at lower echelons. Commanders should use METT-TC to determine the force protection measures (for example, NBC) soldiers will take to enhance survivability and maintain OPTEMPO.

WARNING SYSTEM REQUIREMENTS

7-39. The tactical warning system should have the following attributes:

- *Automated process.* The warning process should minimize human intervention once a TM launch is detected and reported. Ability for manual override should be retained.
- *Timely response.* The warning system must rapidly process and distribute notification of missile launch and impact data to the lowest echelon possible, ideally company level and below. The time from detection of launch to notification of the lowest echelon should be as short as possible to provide maximum reaction time.
- *Reliable communication links.* The transmission of TMD-related data must be highly reliable. All suitable communication means should be used for TMD warning data to assure continuous transmission of information.
- *Accurate reporting.* High accuracy is desired in reporting launch and impact information. Accurate PGIP/T will allow commanders outside the hazard zone to recall their forces from alert status and return to mission essential activities quicker and with less impact on OPTEMPO.

- *Notification*. General warning includes the fact a TM launch has occurred, the time of launch, and the anticipated impact area. This type of information is unclassified and should be routed through the fastest communication links available. As sensors provide more data, specific warnings should be provided to units in affected areas of the battlefield. Note: Certain information such as the identification and types of friendly units in the area may be classified. Proper communications security (COMSEC) procedures should be used in this case.
- *Standardization*. Message formats and grid coordinate systems must be standardized and automated whenever feasible to facilitate clear, accurate, and timely TM early warning. Manual reformatting, plotting, and coordinate conversion is not acceptable. Interoperable communications and common hardware and software should be used throughout the warning system.

WARNING CRITERIA

7-40. Theater commanders establish TM warning release criteria. Reaction time is the critical aspect of warning. In defending against immediate TM effects, warning time should be balanced by the degree of accuracy of the predicted impact point. The initial warning (data) for an incoming TM would come from JTAGS or another member of TES over TIBS or TDDS. CMs and ASMs are normally detected by theater sensors and reported over theater networks. As the estimated impact point data is refined, warnings would be provided only to affected units, passive defense organizations, and active defense units. Such procedures would maximize passive defense, active defense, and attack capabilities while reducing the number of units and personnel unnecessarily warned because they are outside the affected area. The staff must base its recommendation on an analysis of likely COAs and to support all phases of the operation. In general, the criteria should establish whether the TMD warning will maximize unit and individual response time at the risk of excessive tempo degradation or maximize the selectiveness of the warning by allowing sensors more time to refine the accuracy of the impact point prediction. Due to these trade-offs (time vs. accuracy), the force commander must decide the warning criteria during deployment planning. The force commander must also decide appropriate response to warning. If IPB indicates a strong possibility of inbound WMD/WME, then a heightened mission-oriented protection posture (MOPP) level may be the appropriate response. Otherwise, the targeted force may simply take cover for five to ten minutes depending on missile flight time.

WARNING SENSORS

7-41. The following paragraphs describe sensors used to provide information on the TM threat, launch, and impact points. These sensors are extremely accurate and provide detailed information for countering TM threats.

Tactical Ballistic Missiles Sensors

7-42. The DSP satellites are national sensors for detecting and tracking TBMs. In the future, the follow-on to the DSP national sensor system, Space-Based Infrared System (SBIRS), will also be able to detect and track TBMs.

The Army has the Patriot, THAAD, and to a limited extent, Firefinder radars. Other service radars include the Air Force AN/TPS-75 radar, Expert Missile Tracker, and Cobra Ball IR sensor; the Marine Corps AN/TPS-59 radar; and the Navy AN/SPY-1 radar. National sensors are geared toward longer range TBMs while theater sensors are optimized toward SRBMs. (When fielded, the THAAD radar will contribute to MRBM detection.) These systems are either fielded, being modernized, or under development for fielding in the near future.

Cruise Missiles Sensors

7-43. Theater sensors are the primary sources of CM detection and tracking. Army sensors include Patriot and Sentinel radars. Air Force sensors include the E-3B Sentry Airborne Warning and Control System (AWACS), AN/TPS-43, and AN/TPS-75 radars. The Marine Corps sensor is the AN/TPS-59 radar, and the Navy's sensors include the AN/SPY-1 radar and E-2C Hawkeye. The AWACS and the Hawkeye have the advantage of being aerial platforms and may be able to detect CMs at longer ranges than surface-based sensors.

Air-to-Surface Missile Sensors

7-44. Army sensors are primary sources of ASM detection and tracking. ADA radars detect ASMs at significant ranges. Other service sensors such as the AN/TPS-59 can also detect and track ASMs.

WARNING PROCESS

7-45. The AAMDC in theater receives TM warning from national, Army, or other joint sensors. The AAMDC then provides TM early warning to ground-based forces according to the JFC's/Land Component Commander's (LCC's) TM warning guidance. ADA brigades and Patriot battalions also receive TM warning from national and joint sensors through the joint air defense C^2 structure. All units with a Commander's Tactical Terminal (CTT) or Joint Tactical Terminal (JTT) receive the TM warning simultaneously.

7-46. When DSP sensors detect a TBM launch, the raw data is downlinked to JTAGS and other TES ground stations. They process the information and disseminate a warning in accordance with release criteria established by the JFC. JTAGS disseminates the PGIP/T and provides refinements at regular intervals. Updates are continuous as long as sensors are able to track the TBM.

7-47. Theater sensors detect a TBM launch and report the information through their C^2 headquarters to the AAMDC or automatically inject the data into the joint air defense C^2 architecture. Depending on sensor capabilities, a PGIP/T will be computed and disseminated. For active defense operations, ADA commanders and liaison teams at all levels will provide tactical warning to supported units using the same procedures for air defense early warning. The JFC must ensure all units in the theater, including coalition forces, receive timely tactical TM warning.

7-48. When theater sensors detect and track CMs and ASMs, the track data is provided to the air defense C^2 structure and the AAMDC. PGIP/T data for CMs is not computed although the current heading and speed are used to predict the flight path for engagement by defense elements including

combined arms for air defense (CAAD). The AAMDC initiates the force warning process. Simultaneously, ADA commanders and liaison teams at all levels will provide tactical warning to supported units using the same system used for air defense early warning.

7-49. Joint and Army echelons must deconflict and correlate TM warning data received from multiple sensors, so subordinate units are not inundated with duplicate reports. Automation is the key due to the short timelines available to warn the force.

7-50. Based on the JFC/LCC TM warning criteria, the AAMDC should provide TM early warning to forces in the LCC AOR. Subordinate headquarters are responsible for disseminating TM voice warning (as a back up) to their soldiers. The AAMDC also provides the LCC an intelligence assessment on the missile's possible effects (that is, high, low, or no WMD/WME threat) along with the warning. This transmission could be sent from the AAMDC over automated and manual communications systems such as Interim-PAWS (I-PAWS).

WARNING METHODS

7-51. Communications are critical to effectively warn the force of a TM attack. Technologies available will influence warning methods; however, fundamentals will remain the same. The application of advanced communications, related automation, and the use of a common geographic grid system can significantly enhance TM warning dissemination. TM warning dissemination methods include cascading, broadcasting, and pinpointing.

Cascading

7-52. The cascade method of warning the force involves higher echelons notifying subordinate elements of an impending attack (sequentially). This method provides maximum procedural control over TM warning dissemination by requiring each headquarters to provide TM voice warning each subordinate command echelon, but is the slowest method. Digitization of this process using Army Global Command and Control System (AGCCS) hardware and software will expedite passage of TM warning information while retaining control by the respective echelon commander.

Broadcasting

7-53. The broadcast method of warning the force involves a higher echelon broadcasting warning directly to all subordinate echelons (simultaneously) through all means of communications available. This method provides the quickest distribution of time-sensitive information, but it is heavily dependent on operator training and has a tendency over warn or warn unaffected units.

Pinpointing

7-54. Under the pinpoint method of warning the force in theater, the AAMDC transmits TM warnings directly to the specific elements affected by an attack

(point to point). This is the preferred approach when available. This approach also lends itself to automated dissemination of digital messages.

WARNING COMMUNICATION

7-55. The amount and type of communications available to support tactical warning will vary dependent upon assets available within the theater. Warning communications use a variety of service, joint, national, and multinational systems. Specific examples of current and developing communications systems anticipated to be used to disseminate tactical warning to the theater and civilian population centers include:

Joint Tactical Terminal

7-56. JTT is a secure UHF radio system developed to access Army and Air Force tactical intelligence information. JTTs directly receives TBM warnings by TES. This equipment provides warnings of DSP-detected TBM launches to corps, division brigade CPs, and to selected active defense and attack operation units.

Mobile Subscriber Equipment

7-57. Mobile Subscriber Equipment (MSE) is the Army's tactical mobile area telecommunication system for corps level and below. MSE may be augmented using leased commercial lines and interfaces with the existing commercial telephone infrastructure to provide added redundancy and linkages with multinational units and civilian population centers.

Combat Net Radio

7-58. CNR frequency modulation (FM) and amplitude modulation (AM) radios provide an alternative means of voice warning at theater through brigade levels. FM radios will be used as a primary means to pass voice warning and transmit digital messages at battalion level and below.

Satellite Communications

7-59. Satellite communications (SATCOM) established to support theater, corps, and division commanders, are also used to provide tactical TM warnings. Coverage can be further extended using commercial off-the-shelf (COTS), nontactical SATCOM receivers.

Time Division Multiple Access Systems

7-60. JTIDS and Enhanced Position Location Reporting System (EPLRS) radios are secure UHF digital data broadcast systems. Most units will have access to EPLRS, while only selected ADA units will have access to JTIDS. These systems provide direct access to TM information from multiple sensors.

Other Commercial and Developmental Systems

7-61. During Operations Desert Thunder and Desert Fox commercial pagers demonstrated the ability to provide immediate pinpoint warning and one-way text transmission from the AAMDC to selected units. Similarly, use of GPS satellite beacons and satellite-based paging systems to transmit text

messages to small hand-held receivers in real-time is being explored. These and other innovative technologies may increase speed, reliability, and selectivity in the overall tactical warning architecture.

RESPONSE TO WARNING

7-62. Response to warning should be tailored in accordance with METT-TC. Standardized responses should be outlined in unit SOPs. They should be keyed to posturing levels and other survivability actions at the time of tactical warning.

CUEING

7-63. Cueing directs the employment of specialized passive defense assets. Cueing will need to continue after missile impact if WMD/WME are involved.

NUCLEAR, BIOLOGICAL, AND CHEMICAL

7-64. The key to protecting the force against NBC contamination is avoidance. Specific hazard areas must be located, identified, and marked. Resources available to do this include biological and chemical stand-off detectors, NBC reconnaissance system (NBCRS), point detectors such as Biological Integrated Detection System (BIDS), internal assets such as unit NBC equipment operators, and other NBC defense systems. NBCRS (FOX) assets may have to be moved to different areas on the battlefield to determine if a TM event was an NBC event. BIDS may need to be activated or repositioned along with standoff systems' downwind monitors.

MEDICAL

7-65. Medical units may also require warning of potential mass casualties. Medical personnel must quickly identify chemical and biological agents to provide effective NBC casualty treatment. They assist commanders in determining combat effectiveness of units attacked by WMD/WME.

LOGISTICS

7-66. Logistics is the key to maintaining combat power. Logisticians must plan for increased expenditures of barrier materials and NBC supplies (for example, MOPP equipment, NBC alarms, decontamination equipment) in rear areas. They must also ensure there are sufficient quantities of these materials on hand at the beginning of conflict to equip deployed soldiers and units flowing into the theater.

ALL CLEAR SYSTEMS

7-67. All clear systems and processes are required to notify soldiers when hazards are no longer present. Standing down the force from protective measures as soon as possible is key to restoring full combat capabilities. Most all clear systems and processes will originate at unit level and will support decentralized actions in response to TM events to include NBC events. Units that were initially alerted as a result of over warning must be notified that they are not in a hazard area, and the threat from TMs is temporarily over and normal operations should resume. Units that are in the hazard area must be notified when the hazard has passed or when the threat from TMs

has temporarily subsided long enough to relax their passive defense posture. In the event of an NBC hazard event, NBC unmasking procedures should be followed. Intelligence sources will indicate when the TM threat has temporarily declined. NBC and munitions sensors will indicate when the hazard area is clear from NBC contamination or munitions such as mines.

FORCE PROJECTION PLANNING

7-68. Passive defense measures begin in peacetime. Countering the proliferation of missile sales and containing the spread of TM technology are key, but other actions are also necessary. Readiness provides a trained, organized, and equipped TMD force to convince potential adversaries that the use of TMs against US forces would be unsuccessful and counter productive.

SUPPORT COUNTER-PROLIFERATION

7-69. Most counter-proliferation actions will be executed at the strategic level and are proactive initiatives intended to reduce or eliminate the threat of TM from specific countries or theaters. These measures focus on countering the spread of missiles and warheads together with the materials and technologies needed to produce missiles or WMD/WME warheads. These efforts start before combat operations begin and rely heavily on treaties, international agreements, and strategic intelligence.

CONDUCT DETERRENCE

7-70. The US may consider conducting an overt demonstration of both the US force's capability and resolve to contend with a TM threat. This would be planned in advance, executed early, and may involve psychological operations (PSYOPS) and civilian media sources. Television and other communications media may be used in PSYOPS to undermine an enemy's will to employ TMs.

7-71. While deterrence through readiness remains a fundamental objective, an enemy's intent to use missiles may remain a viable threat. In these cases, the US force commander must assess the need and prepare to conduct preemptive strikes if required. Deterrence through readiness is most effective with a preemptive capability to destroy a potential enemy's aircraft, production facilities, storage facilities, missiles, warheads (especially WMD/WME), missile launchers, and other long-range delivery systems. The objective is to reduce enemy target acquisition and targeting capabilities, transportation assets, and C^2 facilities. Conducting deterrence, while a key aspect of early planning, remains a valid requirement throughout TMD operations.

PASSIVE DEFENSE FOR PLANNING CONTINGENCY OPERATIONS

7-72. Joint CONPLANs should be reviewed to ensure TMD passive defense has been properly addressed. This review may identify the need for additional passive defense forces or tailoring forces according to passive defense requirements. The AAMDC ensures all information is provided to units to enable them to plan passive defense operations and to conduct training. The AAMDC will develop the air and missile defense annex for the force

commander's CONPLAN/OPLAN. An example annex is provided at Appendix B.

ENHANCE PERSONNEL AND EQUIPMENT SURVIVABILITY

7-73. Enhancing force survivability involves all those measures taken to ensure that friendly personnel and equipment survive a TM attack with minimal casualties and damage. The first step in enhancing survivability is to accomplish a vulnerability analysis for assessing strengths, weaknesses, and improvement options. The analysis should provide real-time vulnerability assessments and identify possible ways of reducing or eliminating vulnerability through:

- Hardening,
- Redundancy and robustness,
- Dispersal,
- Support of civil defense authorities, and
- NBC protection.

WARN THE FORCE

7-74. Recommendations must be made on warning criteria based on COAs and the commander's guidance. Plans for ensuring that the correct warning system architecture, message protocols, and methodologies are in place must be completed and implemented.

STAGES I AND II—MOBILIZATION AND PREDEPLOYMENT

7-75. Units develop and refine passive defense plans and procedures including OPSEC, deception, EW, camouflage and concealment, recovery and reconstitution. The appropriate mix of passive defense systems are placed high on the TPFDL to accomplish force protection based on METT-TC. Staffs will plan to build field fortifications and improve the NBC hardening characteristics of structures and systems.

PLANNING

7-76. The AAMDC will conduct vulnerability analysis, which should provide real-time vulnerability assessments and identify possible ways of reducing or eliminating vulnerability through hardening, redundancy and robustness, dispersal, supporting civilian defense authorities, and NBC protection. The AAMDC will establish the warning criteria and methodology. The AAMDC coordinates closely with units to ensure this criteria and methodology are incorporated in unit plans.

EXECUTION

7-77. NBC protection requirements are determined and accomplished through continuous training, equipment outfitting, and medical pretreatment of the force to include vaccinations. The purpose of implementing NBC protective measures is to minimize the impact of WMD/WME on operations while protecting personnel and equipment. Hardening measures against conventional and NBC effects are reviewed for adequacy and improved as required. Most system NBC hardening will be accomplished prior to

deployment as part of system design or as an add-on capability. The JFC will consider the need to train and equip civilian defense authorities and augment civil affairs units as necessary with chemical specialists.

STAGES III AND IV—DEPLOYMENT AND ENTRY OPERATIONS

7-78. If counter-proliferation and deterrence are not completely successful, the JFC must develop plans to ensure the force can withstand TM attacks with minimal casualties and damage while accomplishing the mission. This is accomplished through continuous planning and monitoring.

PLANNING

7-79. Counter-proliferation efforts will continue and should be part of a codified peace. The US may become key to counter-proliferation enforcement, especially during the early phase of an operation when US force vulnerability may be high and enemy intentions may be unknown.

Reduce Threat Targeting Effectiveness

7-80. The commander's TMD deception plan will mislead enemy decision makers by falsifying the indicators used by the enemy to discern friendly intentions, capabilities, or dispositions. It is effective when it causes the enemy to deplete TM resources by attacking false targets (decoys), missing intended targets, and by denying accurate BDA. It is also successful when it freezes the threat altogether, causing the threat to retain TM resources but miss attack opportunities. Successful deception in TMD is based on deception plans that are executed correctly, monitored constantly, and modified as necessary to trick the enemy completely. When coupled with deception, camouflage and concealment protect the force from TM attack by manipulating the enemy's TM targeting decisions.

7-81. Mobility includes all those measures taken to ensure high-value elements of the force are never in one spot long enough to provide an effective and lucrative TM target. Commanders and staffs should plan to capitalize on C^4I capabilities to operate within the enemy's decision cycle.

Enhance Personnel and Equipment Survivability

7-82. The US force commander and subordinate commanders are responsible for planning and implementing specific measures to decrease the enemy's targeting capability. The first step in enhancing survivability is to accomplish a vulnerability analysis. The analysis will provide timely assessment and identify possible ways of reducing or eliminating vulnerability through active defense operations, attack operations, hardening, redundancy and robustness, dispersal, training civilian authorities, and NBC protection. The analysis must be done early and updated as necessary. Redundancy and robustness preserve combat power by duplication of critical capabilities that are particularly vulnerable to TM attack. Soft targets such as C^2 nodes, sensors, and fixed sites are of particular concern.

7-83. Commanders and staffs should plan the levels of NBC protection, TM early warning, and force protection measures needed based on METT-TC.

Plans should be designed to minimize the impact of WMD/WME on the OPTEMPO while protecting personnel and equipment.

Plan Recovery and Reconstitution

7-84. Although initial recovery and reconstitution planning would have occurred prior to deployment, continued planning will be required to adapt to changing situations and circumstances. Recovery and reconstitution involves those measures taken to restore the effectiveness of the force after having withstood a TM attack. The plan should consider the mass casualty potential of TMs with WMD/WME payloads and the decontamination requirements generated by WMD/WME impacts.

Warning the Force

7-85. Commanders and staffs should carefully plan appropriate tactics and techniques for warning the force. The AAMDC will establish protocols and architectures for alert and early warning for the ARFOR. Commanders and staffs of ARFOR units should carefully plan appropriate tactics and techniques for warning their forces within these established protocols and architectures.

EXECUTION

7-86. Deployed and deploying units continue to develop IPB and continue vulnerability analyses. In addition, they implement OPSEC, mobility, deception, and camouflage and concealment measures. Field fortifications and WMD/WME hardening of structures and systems are continued; these are especially important during early entry operations. Operational and organizational decisions should include the need and method of accomplishing the mission even if primary resources are destroyed. Upon reaching assembly areas all units establish and test TM warning links and improve the fortifications of fixed sites. SOF units deployed early into theater can conduct UW or PSYOPS to prevent the enemy from using TM assets.

7-87. By dispersing during entry operations and throughout all operations, the US forces will be less vulnerable to TM effects, especially from the potential for mass casualties. This may be more difficult to accomplish during early entry operations, especially in case of forced entry. Dispersal will contribute to the survival of the force, but make it more vulnerable to ground attack. Appropriate trade-offs may have to be made.

7-88. NBC protective measures must be established. The force must be protected through employment of detectors and sensors with organic capabilities and from specialized NBC reconnaissance assets. Collective protection facilities and shelters must be established. MOPP guidance must be issued.

7-89. Following a TM attack, units should be restored to a desired level of combat effectiveness commensurate with mission requirements and available resources. In some instances of mass devastation, whole unit replacement may be necessary. Important elements of recovery include decontamination, replacing lost personnel and equipment, medical treatment of casualties, and conducting remedial training.

7-90. The extent and timing of decontamination will depend on the tactical situation, mission, degree and type of contamination, and resources available. The primary purposes of decontamination are to stop the erosion of combat power and reduce casualties that may result from inadvertent exposure or failure of protection. Timely, correct, and complete decontamination avoids problems, such as protective gear failure and heat stress. Decontamination is costly in terms of manpower, time, space, and materiel; so commanders must use resources wisely. The following principles apply: decontaminate as soon as possible to restore full combat potential, decontaminate only what is necessary, decontaminate as close to the site of contamination as possible to limit its spread, decontaminate the most important items first, and decontaminate in a manner to minimize recontamination through use.

7-91. There are three levels of decontamination. Immediate decontamination is the actions taken by a soldier to survive and continue to fight on the battlefield. Operational decontamination is accomplished using decontamination equipment organic to battalion-sized units and includes wash down and MOPP gear exchange. It allows the force to fight longer by reducing contamination. Thorough decontamination requires support of chemical units. When time permits, thorough decontamination restores almost all-combat power of the contaminated force.

7-92. Commanders must prepare their forces to handle large-scale medical treatment contingencies brought on by TM strikes. Commanders and staffs use IPB to accurately anticipate medical needs and quickly respond to TM attacks. Medical treatment attempts to return sick or wounded personnel to duty or restore them to the best health as quickly as possible.

7-93. In an NBC environment, medical treatments may be complex and diverse. Personnel may suffer from a variety of physiological and psychological “wounds” produced by the effects of TMs with payloads of WMD/WME. Conventional high explosive weapons can produce blast (overpressure) and fragmentation casualties. Nuclear weapons can produce flash blindness, thermal burns, prompt radiation effects, blast effects, and delayed radiation effects. Biological weapons can produce immediate and delayed casualties. Prompt treatment is very important. For some biological agents, treatment initiated before the signs and symptoms of disease appear is usually life saving, while delays until after symptoms appear may prove fatal. The decision on when to provide medical treatment is key to long-term consequences and must be balanced with short-term impacts. Chemical weapons have a variety of effects on the body including both respiratory and skin effects. Untreated chemical agent exposure can lead to death.

STAGE V—DECISIVE OPERATIONS

7-94. Passive defense is necessary to provide essential individual and collective protection of designated assets. Passive defense measures should be planned whenever US forces are threatened.

PLANNING

7-95. Planning for decisive operations is the same as the planning that occurs during deployment and entry stages for force projection operations. Plans and

contingencies must be continuously updated and reevaluated throughout all phases of operations.

EXECUTION

7-96. Execution during decisive operations is essentially the same as occurs during deployment and entry stages. NBC reconnaissance assets and sensors are positioned on the battlefield as appropriate per the latest intelligence information and implementation of passive defense measures such as OPSEC, hardening, decoys, and camouflage continue. Vulnerability analysis continues and recommendations to reduce vulnerability are provided.

7-97. When DSP or other sensors detect a TBM or CM launch and PGIP/T is determined, the warning message (data) is disseminated over theater or CINCSPACE-specified operational networks (TIBS, TDDS). Upon receipt by AAMDC, it may selectively transmit a warning to units and population centers within the targeted area. If more accurate PGIP/T information becomes available, a refined warning may be disseminated by the AAMDC. NBC reconnaissance assets and sensors may be cued toward probable impact points or targeted areas in preparation for the potential need to initiate downwind hazard warnings.

7-98. NBC reconnaissance is conducted. Units observing the impact or detonation and detecting chemical or biological agents submit NBC reports to higher echelons through the NBC Warning and Reporting System (NBCWRS). Medical treatment of casualties is then initiated and NBC decontamination is performed as required. If no NBC agents are suspected or detected, “all-clear” procedures are executed. As soon as it is determined there is no hazard, alerted units will reduce their protective posture.

STAGES VI AND VII—REDEPLOYMENT AND POST CONFLICT

7-99. Following decisive operations, units should be restored to a desired level of combat effectiveness commensurate with mission requirements and available resources. In some instances of mass devastation, whole unit replacement may be necessary.

7-100. Reconstitution includes the assignment of people and equipment and the reorganizing and training of units. Reorganization restores combat effectiveness by cross-leveling assets within a unit, forming smaller units, or by piecing together fragmentary elements into larger units. Regeneration rebuilds a unit in which the mission capability has been reduced or degraded. It will be accomplished through the replacement of personnel and equipment, re-establishment of effective C^2, and will culminate in collective and individual training.

STAGE VIII—DEMOBILIZATION

7-101. Passive defense operations continue as necessary. The necessity may arise from TM threats or from other threats such as terrorist dispersal of NBC munitions, civilian accidents, and discovery of chemical production facilities.

7-102. During post conflict, units may conduct peacekeeping, occupation, recovery, and redeployment operations. All of these operations require a moderate to high level of passive defense operations. This includes the need for a robust warning architecture in order to provide early warning to the forces in the event of an intentional or accidental release of chemical, biological, or radiological contamination or surprise TM attack. Commanders at all levels need to maintain the capability to employ these measures throughout the period of operations and only stand down these capabilities upon successful redeployment of the forces in theater.

7-103. Additionally, during this phase of operations, units and equipment exposed to NBC contamination will be required to completely decontaminate all traces of contamination prior to return of the equipment to home station. The verification process for the equipment is conducted by Army engineer elements.

SUMMARY

7-104. Passive defense is the one operational element of Army TMD operations that all Army units perform. It supplements the effectiveness of active defense and attack operations. Passive defense is not a stand-alone element. It is fully integrated with both active defense and attack operations through the C^4I system.

7-105. Every Army echelon in the theater has passive defense responsibilities and action to take. As with all other procedures, they must be individually and collectively trained and rehearsed. For example, the Army has always participated in efforts to deny potential enemies access to weapons, which could be used against US interests. Army units will attempt to reduce enemy target effectiveness through standard and innovative means. The Army has always developed procedures to warn the force of impending attack so that the force can take the necessary survival measures. Recovery and reconstitution are part of Army force projection operations.

7-106. Passive defense is the application of existing SOPs to an increasingly significant threat. Refinements of warning systems to alert forces in danger of TM attack in short periods of time is a significant change to previous doctrine.

Appendix A

Intelligence Preparation of the Battlespace

This appendix describes the IPB process as it applies to TMD operations. The IPB includes an analysis of the terrain to determine constraints on enemy TM activities and favorable conditions for the establishment of assembly areas, forward operating bases, hide sites, and launch points. It provides the location of areas of interest (AIs) where enemy TMD activities are likely to occur and the identification of TAI, HPTs, and high-value targets (HVTs). It discusses the effects of weather on both friendly and enemy TMD activities and weapons systems.

The IPB is constantly updated as new information is obtained and as the battle situation evolves. Templating is performed continuously to predict likely enemy COAs regarding TM activity, anticipate the enemy actions, and locate TM targets.

PROCESS

A-1. FM 34-130 explains the IPB process in detail. The commander uses IPB to understand the battlefield and the options it presents to friendly and threat forces. IPB is a systematic, continuous process of analyzing the threat and environment in a specific area. By applying the IPB process, the commander gains the information necessary to selectively apply and maximize his combat power at critical points in time and space on the battlefield. IPB for TMD must include aspects from both ground and aerial dimensions. The intelligence staff must consider all the aspects of missile operations and must be aware of the capabilities of all missile threats, including TBMs and airborne TM launch platforms. The intelligence sections have overall staff responsibility for IPB. All officers with TMD staff responsibilities must provide input to the intelligence sections to facilitate integrating TMD into the IPB process.

A-2. The IPB process has four steps:

1. Define the battlefield environment.
2. Describe the battlefield's effects.
3. Evaluate the threat.
4. Determine threat COAs.

A-3. Since terrain, weather, and other characteristics of the battlefield have different effects on TMD operations, TMD IPB differs from ground IPB. Enemy forces must be evaluated in relation to the effects that weather, terrain, and friendly operations will have on them. TMD IPB must be integrated into the IPB process at all levels.

DEFINE THE BATTLEFIELD ENVIRONMENT

A-4. The battlefield includes aerial dimensions to AO, battle space, and AI. During this step, the staff identifies specific features of the environment or activities within it that may influence available COAs or the commander's decisions. TMD IPB focuses on areas and characteristics of the battlefield, which will influence the TMD mission. To effectively define the battlefield environment the following parameters must be considered.

AREA OF OPERATIONS

A-5. The AO is a geographical area assigned by a higher commander to an Army commander who has responsibility and authority for military operations. The AO has lateral, forward, and rear boundaries that usually define it within a larger joint geographical area.

BATTLE SPACE

A-6. Battle space is the environment, factors, and conditions that must be understood to successfully apply combat power, protect the force, or complete the mission. This includes the air, land, sea, space and the included enemy and friendly forces, facilities, weather, terrain, the electromagnetic spectrum, and information environment within the AOs and AIs.

AREA OF INTEREST

A-7. An AI is an area, including the area of influence, from which information and intelligence are required to execute successful operations and to plan for future operations. It includes any threat forces or characteristics that will significantly influence accomplishment of the command's mission. (See also AO and battlespace.)

GEOPOLITICAL CONSIDERATIONS

A-8. Commanders must determine geopolitical considerations and constraints, which could affect operations including:

- Population demographics (for example, ethnic groups, religious groups, age distribution, population concentrations, and income groups).
- Political or socio-economic factors including the role of clans, tribes, gangs, et cetera.
- Infrastructure, such as transportation or communications.
- ROE.
- Legal restrictions, such as international treaties or agreements.

COMMANDER'S CRITICAL INFORMATION REQUIREMENTS

A-9. Critical information directly affects the successful execution of operations. The commander's critical information requirements (CCIR) include information the commander requires that directly affects his decisions and dictates the successful execution of operations. CCIR are:

- Applicable only to the commander who specifies them.
- Directly linked to present and future tactical situation.
- Situation-dependent.

- Events or activities that are predictable.
- Specified by the commander for each operation.
- Time-sensitive information that must be immediately reported to the commander, staff, and subordinate commanders.
- Always included in an OPORD or OPLAN.
- Transmitted by a communications system specified in the SOP.

A-10. The CCIR are expressed as three types of information (see FM 101-5-1):

- Priority intelligence requirements (PIR).
- Friendly forces information requirements (FFIR).
- Essential elements of friendly information (EEFI).

DESCRIBE THE BATTLEFIELD'S EFFECTS

A-11. The effects of terrain and weather on the enemy and friendly forces must be analyzed. The terrain and weather must be analyzed from both a ground and aerial standpoint.

TERRAIN ANALYSIS

A-12. Once the AO and AI have been established, the terrain must be analyzed by looking closely at observation and field of fire, cover and concealment, obstacles, key terrain, and avenues of approach (OCOKA) to determine the effect of that terrain on TMD operations. During this analysis, the TMD planners determine probable BM and CM launch points, hide positions, movement routes, et cetera. Automated terrain analysis systems provide a helpful tool to examine specific areas for suitability.

Observation and Fields of Fire

A-13. In IPB, observation relates to optical and electronic line of sight (LOS). LOS plays an important role in operations for ground-based radar systems. Radars rely on LOS to detect and track enemy TMs, so terrain must be analyzed to determine areas of radar coverage. Coverage diagrams constructed either by automated or manual means may aid this process. Attack and reconnaissance aircraft require LOS to detect, acquire, and/or attack their targets. These criteria, applied to terrain, allow the TMD planner to determine what types of threats are and are not able to operate throughout the AI.

Cover and Concealment

A-14. Concealment measures are a double-edged sword offering protection to enemy and friendly forces alike. CMs may attempt to use terrain to prevent detection and to protect them from direct fire. Radar systems may be able to use camouflage, emission control, thermal masking, and other techniques to avoid being targeted. The need for cover and concealment must be considered along with the need for good radar coverage along probable enemy air avenues of approach. Enemy mobile missile launchers normally occupy hide sites prior to moving to and firing from predetermined launch points. Hide sites are concealed positions usually located in relatively close proximity to launch points.

Obstacles

A-15. Obstacles for air breathing threats are anything that cause aircraft or CMs to follow particular flight profiles or routes, or that cause them to gain excessive altitude. Some examples of air obstacles are tall trees, power lines, towers, built-up areas, weather, threats, mountains, et cetera.

A-16. Ground obstacles may restrict or constrain the movement of enemy mobile missile launchers. Narrow roadways, bridges, and difficult terrain may channelize movement of missile launchers along specific routes. Analysis of these obstacles may help predict TEL movement routes.

Key Terrain

A-17. Key terrain is any locality or area in which the seizure, retention, or control of it will afford a marked advantage to either combatant. In the aerial dimension, these consist of terrain features that channelize or constrain air threat systems and terrain with an elevation higher than the maximum ceiling of threat systems. Other areas that may be considered as key terrain are airfields, missile launch sites, enemy hide positions, and TM logistic sites.

Air Avenues of Approach

A-18. Air avenues of approach are those routes that protect CMs and airborne TM launch platforms from detection and engagement, while still allowing maneuver and providing adequate LOS to accomplish the mission. Enemy BMs are relatively unaffected by masking considerations. Factors that should be used to determine air CM avenues of approach, both ingress and egress are:

- Type threat, attack profile, and ordnance.
- Point of origin and ground control radar positions.
- Probable threat objective.
- Freedom to maneuver within the air avenue.
- Protection afforded to the system.

A-19. **Type of Air Threat.** Most surfaced-launched CMs are terrain following, and they use terrain masking. Due to their range, they may take indirect approach routes. TBMs are not terrain dependent. They fly a straight ground track from launch point to objective. Their flight is not restricted by terrain. ASMs usually fly direct routes from launch platform to the target. Fixed-wing aircraft usually follow major terrain features. Depending on range, they may fly a straight line to the target. Ordnance or payload may affect range and altitude of the air system and, thus, influence the selection of avenues of approach.

A-20. **Point of Origin.** When determining air avenues, the staff looks at the commander's entire AI. Analysis begins at the threat airfield or missile launch site and works toward the probable enemy objective. This allows a look at the big picture. The staff considers the range of the air systems and location of navigation aids and ground control sites.

A-21. **Probable Threat Objective.** Each avenue of approach must end at a target. Reverse IPB is used to pick threat objectives.

A-22. **Freedom to Maneuver.** Does the avenue—

- Channelize the air system?
- Have access to adjacent avenues?
- Provide the ability to acquire a target and use available munitions?
- Assist in navigation?

A-23. **Protection for System.** Does the avenue provide—

- Terrain masking (cover and concealment)?
- Opportunity for the full use of system speed?
- Protection against radar detection?
- Protection from air defense weapon systems and tactical air support?
- Standoff orbit location and allowance for a standoff orbit?

Examples of Areas with Terrain Analysis Implications

A-24. Specific areas of enemy TMD operations with direct impacts on terrain analysis include:

- Marshaling areas,
  - Oblique and vertical LOS.
  - Concealment from friendly intelligence collection systems.
  - Cover from deep attack systems.
  - Minimal ground obstacles which restrict or constrain the movement of missile launchers (narrow roadways, bridges, heavy vegetation, rivers, poor surface materials, et cetera).
- Assembly areas (forward operating bases) for missile battalions,
  - Access to hard surface roads.
  - Cover and concealment for 50–60 vehicles.
  - Access to landline communications.
- Launch points,
  - Location of potential TM targets.
  - Range of missiles.
  - Roads between the site, hide, and resupply positions.
  - Terrain slope and trafficability restrictions.
  - Cover and concealment.
  - Open areas to fire from (dependent upon threat system characteristics).
- Hide positions,
  - Cover and concealment for two to three vehicles (caves, overpasses, mine shafts, wooded areas, buildings, et cetera).
  - Access to improved dirt roads.
  - Good communications locations (AM/FM, land line).
- Reload sites**,** and
  - Cover and concealment for 5–10 vehicles (for example, open areas with woodlines).
  - Isolated areas.

  - Access to multiple roads.
  - Access to landline communications.
  - ADA short-range radar signatures with no tactical units present.
- Cruise missile operations areas.
  - Low-level air avenues of approach for CMs and UAVs.
  - Indications of CM launch vehicle or carrier activity or capability.

WEATHER ANALYSIS

A-25. Weather analysis is performed to determine the effects of weather on both friendly and enemy missile defense weapons systems, intelligence sources, and missile performance. Among factors that should be considered are visibility, wind speed and direction, precipitation, cloud cover, temperature, and humidity. The supporting weather unit can provide weather data and information on weather effects on the theater of operations.

Impact on Theater Ballistic Missiles

A-26. The following weather conditions could have an impact on TBMs:

- High upper atmosphere winds can have a derogatory effect on the accuracy of TBMs.
- Extremely cold weather could cause icing conditions.
- Heavy precipitation could impact road trafficability thereby reducing the mobility of TELs.

Impact on Cruise Missiles

A-27. The following weather conditions could have an impact on CMs:

- Ground and sea-launched CMs may be affected by icing conditions in cold weather.
- Air-launched CMs (ALCMs) may be affected by the same weather conditions that affect air operations such as strong winds, extreme cold, icing conditions and poor visibility.
- Heavy precipitation could impact road trafficability thereby reducing the mobility of mobile CM launchers.

EVALUATE THE THREAT

A-28. Threat evaluation for TMD operations consists of a detailed study of enemy TM capabilities, organization, and doctrine. The following steps should be used when evaluating the threat:

- Collect and analyze doctrinal threat data.
- Analyze threat TM capabilities.
- Conduct target evaluation.

COLLECT AND ANALYZE DOCTRINAL THREAT DATA

A-29. Typical questions that should be answered during this step are listed below. Analysis in this phase must also include the commander's critical information requirements and priority intelligence requirements:

- What are the major strategic, operational, and tactical objectives of the enemy's TM operations?
- Which objectives may be targeted for destruction or suppression?
- Where do friendly air defense assets fit into the enemy's objectives? Do they need to be destroyed or suppressed for the enemy plan to work? Answers to these two questions may result in modification to predicted air avenues of approach.
- What is the enemy's TM order of battle (OB)? How are the assets organized? Knowledge of threat organization, and who has operational control, will indicate the importance of the AO. What is the size of the enemy BM brigade, battalion, or battery? Does it fire as a unit? Does the threat have mobile, fixed, or both types of launchers?
- How does the enemy doctrinally attack? Will the enemy synchronize the air and missile attack?
- What are air system ingress and egress speeds?
- Where are missile launch points? What are the likely targets? What are the range, endurance, and profile of these systems?
- At what altitude will the enemy approach the target, launch TMs, and exit the target area?
- What is the release authority of certain types of ordnance? This is particularly important when dealing with NBC threats.
- How has the enemy historically fought?

ANALYZE THREAT AIR CAPABILITIES

A-30. TMD IPB must evaluate a broad range of OB data and threat capabilities. This analysis also evaluates the answers to the following questions.

Aircraft

A-31. What are the capabilities of the air systems in terms of—

- Performance (speed, altitude, airfield restrictions, troop, and weapon load capacity)?
- Endurance and range? Ingress and egress altitudes and speeds?
- Levels of combat readiness and sortie generation rate?
- Standoff ranges for CMs and tactical ASMs?
- Ordnance load (maximum weight, type, load mixture, and level of sophistication)?
- Navigational capability (types of radar, night flight, and adverse weather capabilities)?
- Combat radius (with or without external tanks, ordnance, location of staging bases)?
- Loiter time (how long will systems have on station over the target area)?
- Countermeasures environment? For example, will standoff jammers, ground-based jammers, reconnaissance or chaff-laying UAVs, or aircraft degrade friendly air defense systems?

- Type, quantity, and quality of training have the enemy pilots received?
- Extent to which the enemy conforms to doctrine?
- Ability of pilots to fly at night or perform contour flying? During peacetime did the pilot conduct the type of mission expected to be conducted during war?

Theater Ballistic Missiles

A-32. What are the capabilities of threat TBM systems in terms of—

- Performance (flight time, flight characteristics, speed, trajectory, launch restrictions)?
- Maximum and minimum ranges?
- CEP?
- Crew proficiency and training levels?
- Reload and refire time? What is the number of TBMs available per transporter erector launcher?
- Warhead types and sizes?
- Guidance modes?
- Locations of surveyed launch sites?

Cruise Missiles

A-33. What are the capabilities of threat CM systems in terms of—

- Performance (flight time, flight characteristics, speed, altitude, and launch restrictions)?
- Maximum and minimum ranges?
- CEP?
- Targeting capabilities and type?
- Contour flying capability?
- Vulnerability to countermeasures?
- Guidance modes?
- Warhead types and sizes?

Industrial Facilities

A-34. Specific information requirements regarding industrial facilities include:

- What are the locations of missile, launcher, and warhead manufacturing and assembly plants and types of missile, launcher, and warheads manufactured at each plant?
- What is friendly ability to strike these TM targets?
- What is the potential impact of loss on the enemy's capability to conduct TM attacks?
- What numbers of TM items are produced per unit of time? What is the ability to proceed from production to delivery of operational missiles to launch sites?

- What are the locations of missile and warhead inventory, the numbers and types of missiles and warheads at each location, and the capability to transfer them from stockpiles to operational sites?
- What are those key materials necessary for the manufacture of TMs? What is the ability of the enemy to obtain or produce them, and the timelines for production of TMs? What are the locations of handling and processing facilities for key materials?
- What are the locations of storage facilities for missile fuel and associated air defense emplacements?

Marshaling Areas

A-35. Specific information requirements for determining possible marshaling sites include:

- What is the size of area required based on types of activity, types of units, and numbers of units?
- What is the distance from possible launch points and travel time(s) required to reach them?
- What is the assembly time needed?
- What are the current mobility and transportation assets?
- What are the signature ranges from electronic intelligence of equipment, such as air defense radars and radio transmitters? What are the aggregate signatures, such as the amount of heat produced by large number of internal combustion engines?
- Does the enemy use decoys and OPSEC measures to induce confusion as to whether a site is an actual marshaling area?

Launch Points

A-36. Specific information requirements for determining possible launch points include:

- What are the distances from hide sites and travel times?
- What is the time required for emplacement once the unit has arrived at a launch point?
- What are the signatures both prior to and after a launch? (for example, air defense radar emissions, communications with higher authority for C^2)
- Does the enemy use decoys and OPSEC measures to induce confusion as to whether a site is an actual launch point?
- What are the times required to displace?

Hide Sites

A-37. Specific information requirements for determining possible hide sites include:

- What are the distances from launch sites and travel times?
- What times are required to reload once the unit has returned from a launch?
- What are the signatures at a hide site?

- Does the enemy use decoys and OPSEC measures to induce confusion as to whether a site is an actual hide site?

CONDUCT TARGET VALUE EVALUATION

A-38. This action should determine what targets are to be labeled as HVTs. HVTs are assets the enemy or friendly commander has deemed as important for the successful accomplishment of a particular mission. HVTs are determined by operational necessity and weapon system capability.

DETERMINE THREAT COURSES OF ACTION

A-39. Subsequent to evaluating threat missile forces preferences and the effects of the operational environment, likely enemy objectives and COAs must be evaluated. The G2/S2 develops enemy threat models that depict the threat's TM COAs. They also prepare event templates and matrices that focus intelligence collection on identification of which COA the threat will most likely execute. The process of developing these templates and matrices is covered in depth in FM 34-130. The decision support template is an integrated staff product that results from the analysis of potential friendly COAs.

SITUATION TEMPLATE

A-40. The situation template is a doctrinal template arrayed on the map, integrating TM attack profiles with weather and terrain restrictions and with confirmed intelligence added. The completed situation template shows the movement of enemy missile units from their lager sites to upload and fueling sites, to hide positions, and to prospective fire positions; as well as deployment timelines and prospective targets. This process assumes knowledge of enemy doctrine and employment tactics. The planner must also consider the possibility that an enemy might deviate from normal procedures.

EVENT TEMPLATE

A-41. Built on the situation template, the event template is an intelligence collection plan built into graphic form. It incorporates time phase lines (TPLs) that depict expected movement times and rates for TM forces and support elements. Event templates provide a means of comparing activity on different avenues of approach. In order to make the template useful for enemy TM analysis, it is sometimes helpful to create a separate TM event template. The event template provides answers to the questions where to look, when to look, and what to look for.

A-42. The event template identifies areas called NAI, which are points or areas where enemy activity or lack of activity confirms or denies enemy COAs. Each NAI must be monitored by a sensor or other means. Prospective firing locations for TBM and CM units could be listed as NAI. Large blocks of airspace through which missiles might travel could also be NAI. Those NAI that the unit cannot monitor with its own assets are sent to higher echelons with a request that those specific areas be monitored. It is critical that NAI be placed far enough out that decisions can be made in time for units to react to specific intelligence collection at the NAI.

DECISION SUPPORT TEMPLATE

A-43. The decision support template (DST) displays all of the information from the situational template and the event templates. It is a graphic picture of the intelligence estimate combined with the OPLAN. The DST does not dictate decisions to the commander; rather it identifies when and where decisions must be made. This is done through TAI and decision points (DPs).

A-44. TAI are areas where interdiction of enemy forces by maneuver, fires, or jamming eliminates or reduces a particular enemy capability. These TAI are depicted on the DST and indicate that some type of fires or counteraction must be planned and coordinated. If NAI have been properly identified, enemy activity within those NAI will indicate which TAI are of immediate interest. Sample TAI may include:

- Bridges and road junctions.
- Choke points.
- TEL hide areas.
- TBM launch sites.
- Marshaling areas.
- Airfields.

A-45. DPs identify those events and areas that may require a tactical decision and when decisions must be made. The commander selects DPs. Example decisions might include types and numbers of engagements, changes in EMCON status, CSS adjustments, and relocating fire units. If NAI have been properly placed, they indicate when and where decisions must be made. Factors affecting placement of DPs include the time required to:

- Collect and process the information concerning an event.
- Provide the information to the staff and commander.
- Evaluate and decide.
- Disseminate orders.
- Designate the asset to implement the decision.

A-46. A decision support matrix is an alternate means of showing the commander those decisions that he will face. The matrix indicates the DPs, options available, NAI and collection assets providing the cues and appropriate TAI. The matrix can be structured by area or by time. Many commanders find the matrix form easier to use than the graphics format.

SUMMARY

A-47. IPB is a systematic, continuous process for analyzing the threat and environment in a specific geographic setting. Applying the IPB process helps the commander apply and maximize his combat power at critical points in time and space by determining the threat's likely COAs and describing the environment and its effects on operations. Preparation and continuous updates of the IPB are fundamental to the execution of the TMD mission on the modern battlefield. When considering IPB and TMD, both ground and aerial IPB are equally significant. IPB should be a synergistic product combining all dimensions and not delineated by separating the aerial portion from the ground portion of the process.

Appendix B

Air and Missile Defense Annex

The following is a sample Army level air and missile defense annex with related appendices (see FM 101-5, Appendix H).

ANNEX ___(AIR AND MISSILE DEFENSE) TO OPERATIONS ORDER NO ___

References: Maps, charts, datum, and other relevant documents.

Time Zone used throughout the Order:

1. **SITUATION.** Thoroughly describe the operational environment in which the major operation will be conducted. Include tactical information for early phases of the operation.

2. **MISSION.** The Army air and missile defense mission to be conducted is stated in this paragraph. This paragraph provides an overview of the missions of integrated air and missile defense operations in support of the maneuver forces. The specific TMD mission is to protect US forces, US allies and selected assets from TM attack. The mission is accomplished by planning, coordinating, deconflicting, and executing air and missile defense operations to provide for the application of an integrated and coordinated mix of mutually supporting capabilities making up the four operational elements of TMD.

3. **EXECUTION.** Provide a statement, in general terms, of the commander's vision of air and missile defense mission accomplishment.

   a. **Concept of Operations.** Describe the commander's vision of how the air and missile defense mission will be accomplished for all phases of the operation, to include the intent for the execution of operations for each of the four TMD operational elements. Discuss defense of critical assets, priorities, sensors, active defense, attack operations, passive defense, and areas of responsibility for each phase of the operation.

   b. **Tasks To Subordinate Units.** Provide the tasks for each phase of the operation in a subparagraph for units supporting TMD operations.

4. **SERVICE SUPPORT.** Provide operational support instructions that are of primary interest to the elements being supported. Refer to the basic OPLAN.

5. **COMMAND AND SIGNAL.** Provide information concerning command post locations, succession of command and liaison requirements. In broad terms, state, the primary links for synchronizing and integrating air and missile defense operations.

APPENDIX 1. INTELLIGENCE

1. **SITUATION.**

2. **MISSION.**

3. **EXECUTION.**

   a. **Areas of Operation.** Identify specific features of the environment or activities within AO that may influence available COAs or the commander's decisions. Focus on the characteristics that will influence the air and missile defense mission.

   b. **Enemy Situation.** Describe the enemy TM situation. Include disposition, composition and strength, TM weapon capabilities, recent significant activities, and peculiarities and weaknesses regarding enemy TM forces.

   c. **Enemy Capabilities.** Provide a determination of threat TM force capabilities; doctrinal principles; and tactics, techniques and procedures threat forces prefer to employ.

   d. **Doctrinal Template.** The doctrinal template illustrates the deployment pattern and disposition preferred by the threat's normal tactics when not constrained by the effects of the battlefield environment.

   e. **Named Areas of Interest.** NAI are points or areas where enemy activity or lack of activity confirm or deny enemy COAs. Each NAI must be designated for monitoring by a sensor or other means.

   f. **Priority Information Requirements.** PIRs are information requirements compiled by the commander regarding enemy COAs or capabilities that could significantly impact on the commander's decisions or identify critical intelligence gaps.

4. **SERVICE SUPPORT.**

5. **COMMAND AND SIGNAL.**

TAB A Doctrinal template.

TAB B NAI.

APPENDIX 2. ATTACK OPERATIONS

1. **SITUATION.** Describe the situation in terms of enemy TM forces and capabilities and friendly units available for TMD attack operations.

2. **MISSION.** Describe the mission of attack operations capable forces.

3. **EXECUTION.**

   a. **Concept of Operations.** Describe the concept of operations for each phase of the operation. Include attack operations guidance and targeting priorities.

   b. **Air Support.**

   c. **Field Artillery.**

   d. **Army Aviation.**

   e. **Naval Support.**

   f. **Electronic Warfare.**

   g. **Coordinating Instructions.**

   h. **Reporting Instructions.**

4. **SERVICE SUPPORT.**

5. **COMMAND AND SIGNAL.** Designate the authority for prioritizing, coordinating, and deconflicting attack operations. Provide locations for the AAMDC, DOCC, JFACC, MLRS units, SOF units, and Army Aviation units.

APPENDIX 3. ACTIVE DEFENSE

1. **SITUATION.** Describe the situation in terms of enemy TM forces and capabilities and friendly units available to conduct TMD active defense operations.

2. **MISSION.** Provide an overview of the mission of integrated active defense operations in support of the maneuver forces.

3. **EXECUTION.** Include a description of the concept of operations and coordinating instructions, (for example, ROEs).

   a. **Concept of Operations.** State the plan for the early deployment of active defense units to defend the force and high priority, critical assets. Develop a time-phased plan for disposition of active defense assets and defended forces as they arrive in theater. Describe procedures for airspace control and coordination between the Joint Force Staff, JFACC, AADC, ACA, ARFOR, AAMDC, and EAC and Corps ADA brigades. Describe procedures for tactical control of fire control elements. Develop these procedures in accordance with procedural rules developed by the AADC and Joint Force Staff coordinator.

   b. **Coordinating Instructions.**

4. **SERVICE SUPPORT.**

5. **COMMAND AND SIGNAL.** Designate the authority for prioritizing, coordinating, and deconflicting active defense operations. Designate responsibility for coordination and execution of the TMD active defense plan. Provide locations for ADA brigade TOCs, Joint Force Staff, AADC, and AAMDC.

TAB A TMD priorities.

APPENDIX 4. PASSIVE DEFENSE

1. **SITUATION.** Describe the situation in terms of enemy TM forces and capabilities and friendly vulnerability to TM attack.

2. **MISSION.** The TMD passive defense mission to be conducted is stated in this paragraph.

3. **EXECUTION.** Describe how Army units will apply passive defense measures to warn the force, reduce targeting effectiveness, enhance personnel and equipment survivability, and recover and reconstitute if attacked.

4. **SERVICE SUPPORT.**

5. **COMMAND AND SIGNAL.**

TAB A Warning devices.

APPENDIX 5. COMMUNICATIONS

1. SITUATION.

2. MISSION. State, in broad terms, the primary communications links for synchronizing and integrating TMD operations.

3. EXECUTION.

a. Concept of Operations. This section describes the communications links and nets that facilitate communications for each phase of the operation. Communications with higher and lower echelon units are described as well as connectivity to various nets and sensors. Describe voice and data networks and links for early warning, communications with higher and lower echelon units, joint communications, and communications with other service components, LNOs, and the BCD.

4. SERVICE SUPPORT.

5. COMMAND AND SIGNAL.

TAB A MSE/Tri-Service Tactical Communications (TRITAC) network.

TAB B FM nets.

TAB C Antenna farm.

TAB D Communications diagrams.

TAB E Early warning net.

TAB F LNO net.

APPENDIX 6. C^2 WARFARE

1. **SITUATION.**

2. **MISSION.** State the C^2W mission as it affects TMD operations.

3. **EXECUTION.** Describe the employment of C^2W measures including C^2 protection and destruction or interference with enemy TM C^3I.

4. **SERVICE SUPPORT.**

5. **COMMAND AND SIGNAL.**

Appendix C

Theater Missile Defense Communications

This appendix provides a summary of the TMD communications architecture and the communications equipment available to commanders in a theater of operations. To support joint and Army doctrine over the full range of contingency operations, considerable freedom must be provided to the JFC to ensure that his range of operational options is not unduly restricted. The services must provide "tailored" force packages that have both the technical and operational agility to be brought together as elements of appropriately integrated operations. This means that considerable flexibility must be preserved for how these service elements can interconnect and interoperate, both in exchanging information in a timely manner (performance effectiveness) and in forming effective, cohesive, and integrated operations in terms of doctrine, concept of operations, tactics, techniques, procedures, and practices (operational efficiency). The goal is to ensure that command flexibility is not restricted by limitations in technical interoperability.

The JFC will tailor the tactics, techniques, and procedures (TTPs) resource assignments and organizational structure of the force to meet the unique circumstances of the theater and the momentary composition of the joint/coalition force. Each situation will likely be different and may introduce new interfaces and relationships among the component force elements. Commanders will determine communications architectures based on METT-TC. METT-TC will give each theater uniqueness in terms of systems deployed and their respective connectivity.

Communications support for air defense and TMD is only achievable through the synergistic application of the family of systems concept. This requires seamless interoperability across platforms, echelons, services, and boundaries all orchestrated toward the "unity of effort" principle of war. Throughout this appendix TAMD is used to accurately reflect connectivity for battlespace operations. Connectivity is seamless regardless of whether the mission area is TMD or TAMD.

THEATER AIR AND MISSILE DEFENSE COMMUNICATIONS ARCHITECTURE

C-1. Communications architectures support joint battle management functions that exist between service component structures and the information flow required in support of these functions. The value added by a secure, reliable, and redundant communications architecture is that it

provides a framework for connecting TAMD functions laterally between service operational facilities (OPFACs) and vertically between the services and the joint elements. Simply connecting service functional TMD areas via communications, data links, procedures, or other means does not, however, ensure interoperability. At best the connections facilitate cooperation and coordination between the service capabilities. Warfighting interoperability necessitates an understanding of how to share and capitalize upon the abundance of TAMD information resident within the service component systems and organizations.

C-2. The communications architectural level designations of JTF Level, Control Level, and Execution Level are illustrated in Figures C-1 through C-5. The designations reflect the complex TAMD operations and interactions exercised by that particular echelon.

C-3. *Joint Task Force Level* (top level) functions detailed in Figure C-1 are primarily planning in nature and involve considerable service-wide coordination—within a service, across the services, and with the joint force elements (for example, AADC, ACA, JFACC, JFMCC, JFLCC, et cetera).

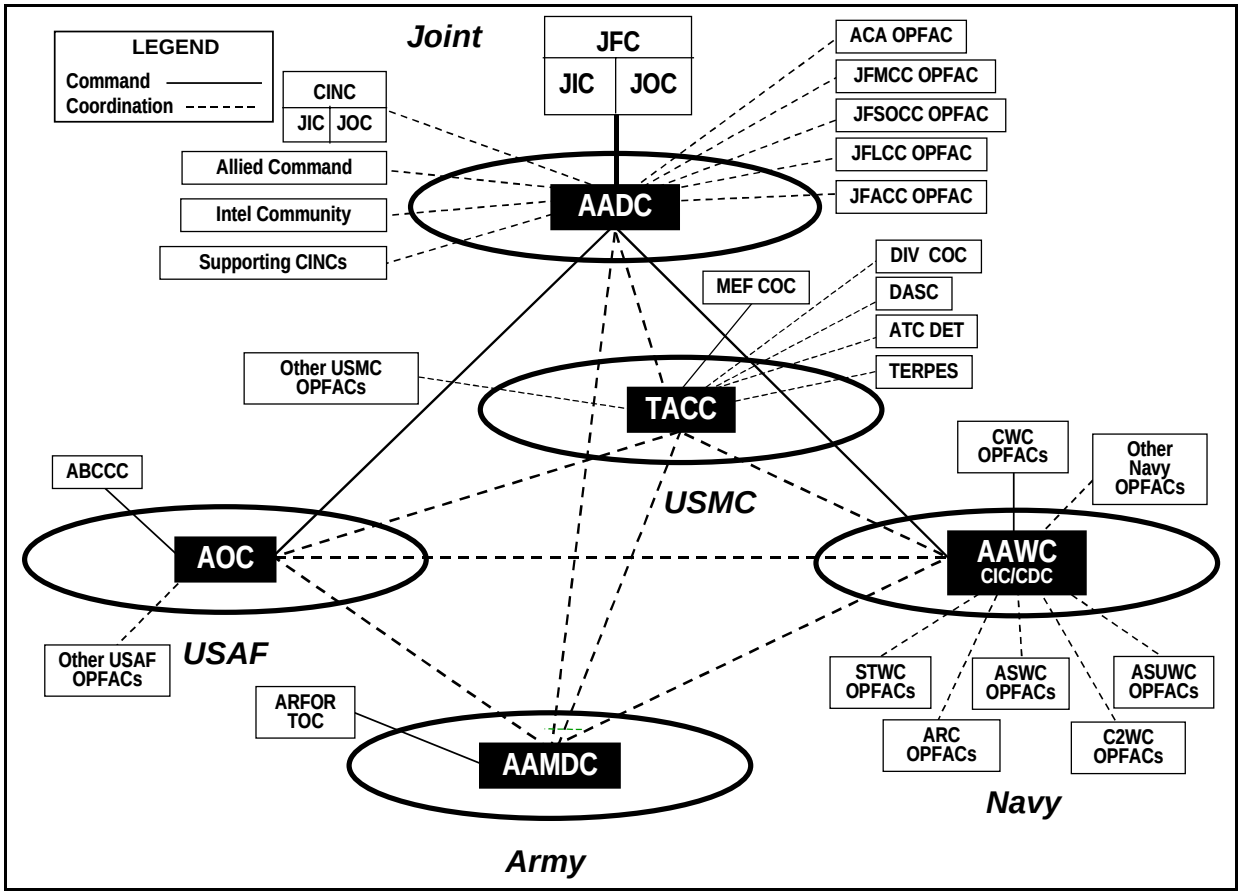

Figure C-1. Command and Coordination of Other Services TAMD Systems (JTF Level Detail)

C-4. *Control Level* (mid level) functions shown for each of the Services in detail in Figures C-2 through C-5 involve TAMD resource management (that is, sensors and weapons), coordination of the allocation of AORs among subordinate organizational entities, monitoring of the battle progress, and making resource adjustments.

C-5. *Execution Level* (bottom level) functions also shown for each of the Services in Figure C-2 through C-5 are focused on the weapon/sensor system operations and engagement execution (for example, the Patriot/SHORAD battery is at the Execution Level because it executes engagements). Note that the Execution Level actually includes sensors as well as weapons.

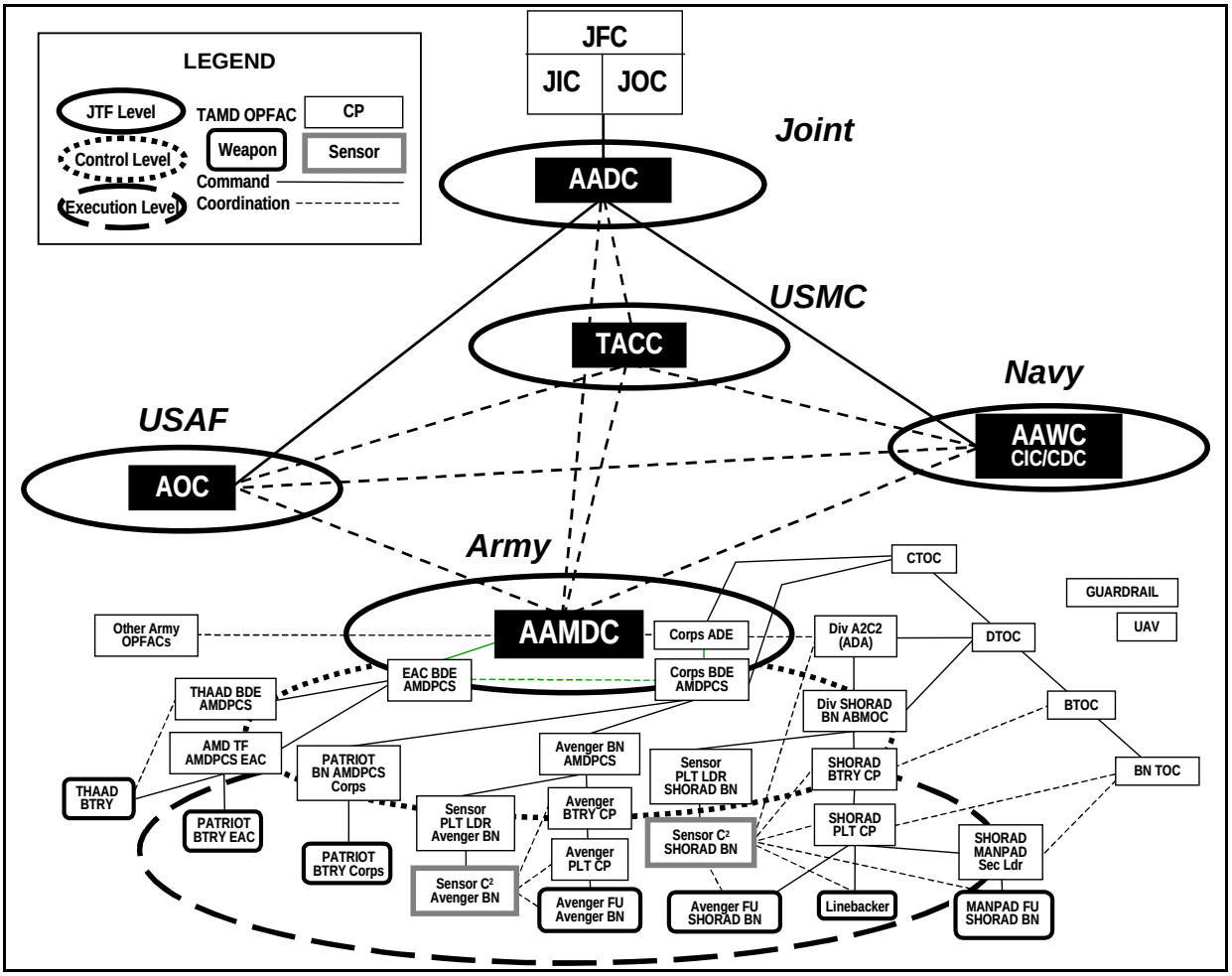

Figure C-2. Command and Coordination of Army TAMD Systems (Control and Execution Level Detail)

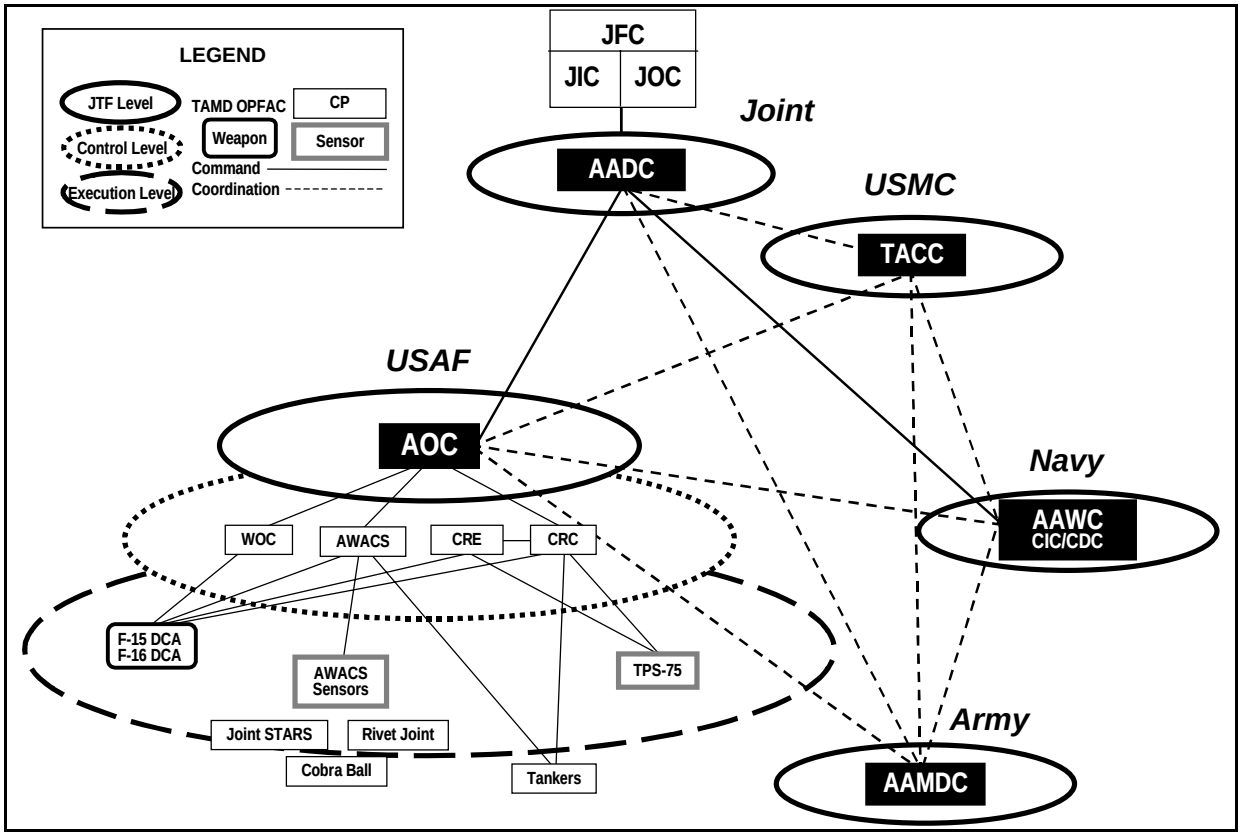

Figure C-3. Command and Coordination of Air Force TAMD Systems (Control and Execution Level Detail)

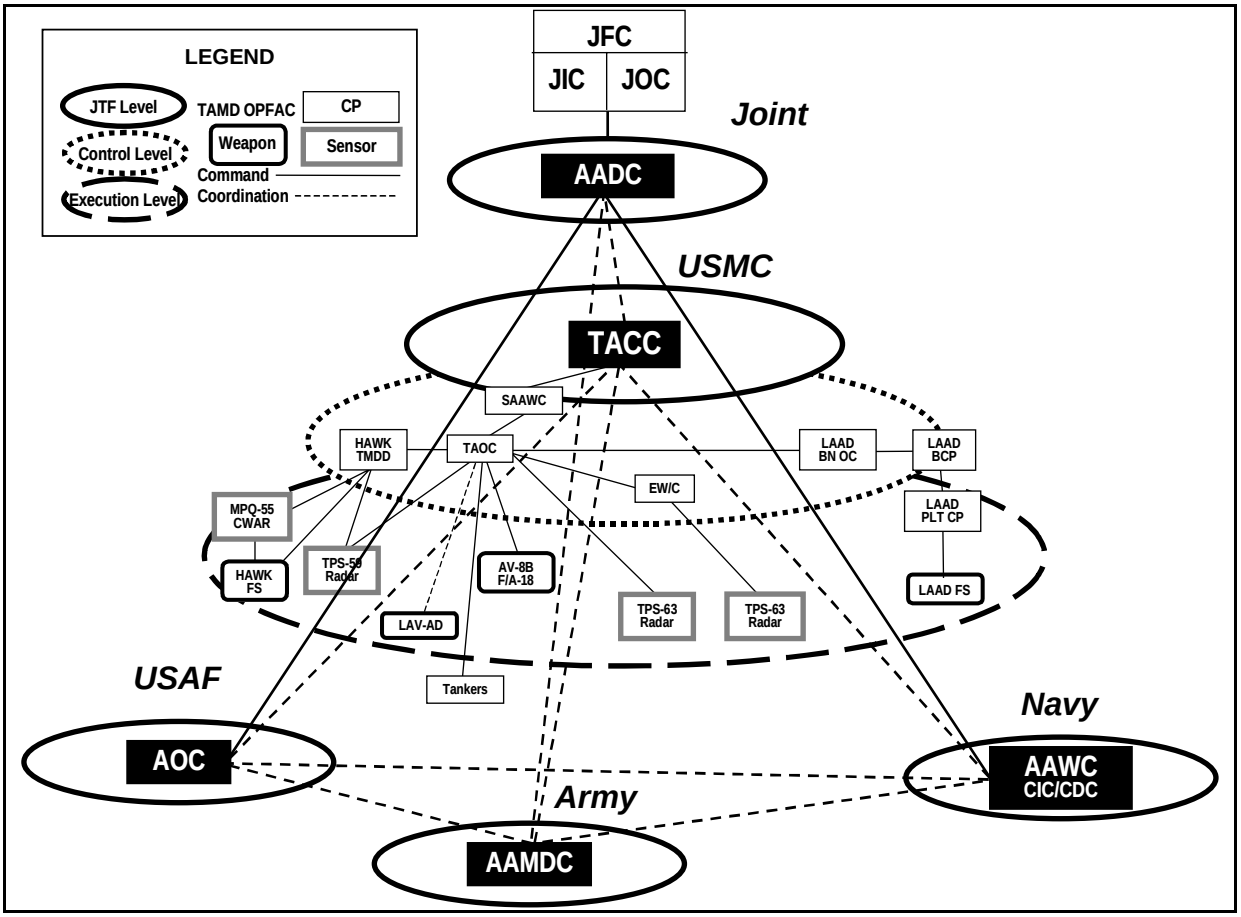

Figure C-4. Command and Coordination of USMC TAMD Systems (Control and Execution Level Detail)

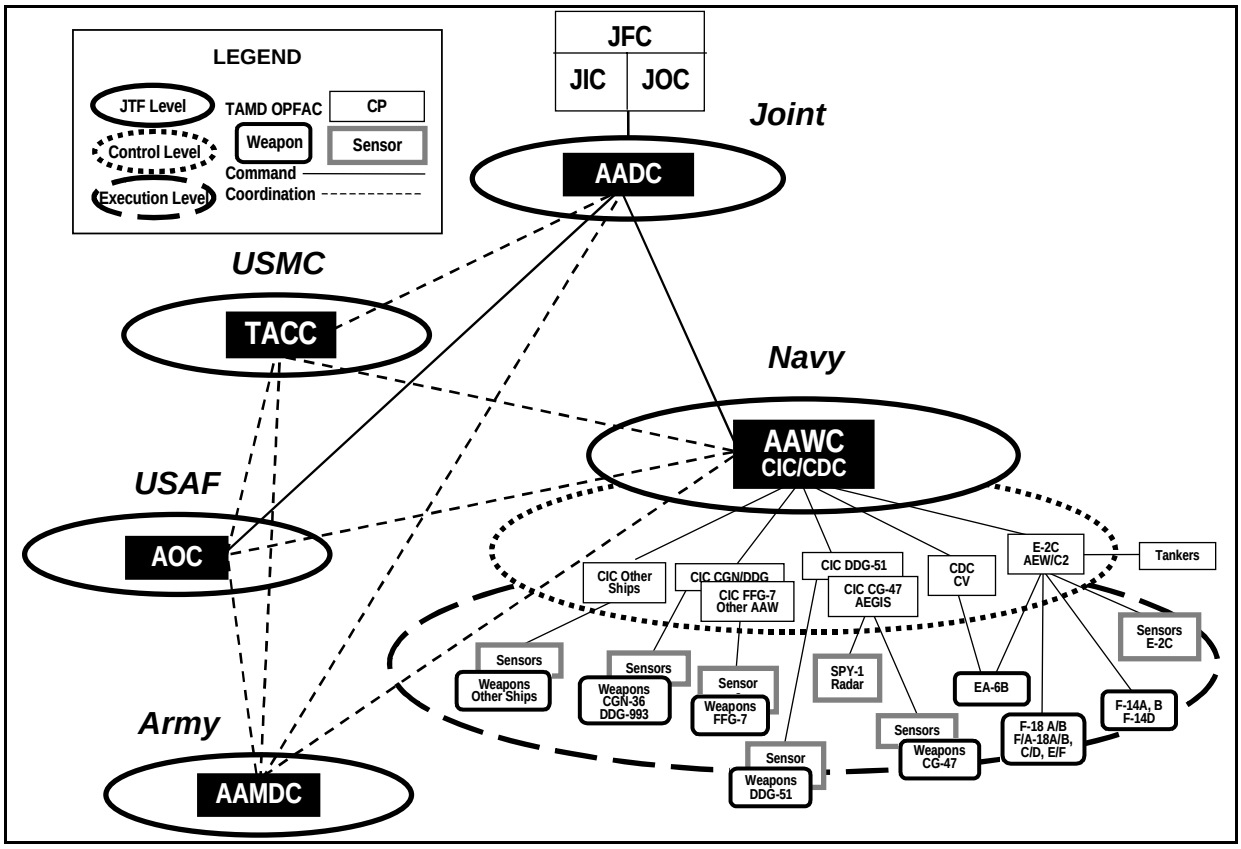

Figure C-5. Command and Coordination of Navy TAMD Systems (Control and Execution Level Detail)

THEATER AIR AND MISSILE DEFENSE COMMUNICATIONS EQUIPMENT

C-6. The following voice and data communications equipment is used to communicate within a theater of operations. Due to ongoing force modifications of communication equipment, each theater will have different communication equipment based capabilities.

COMMANDER'S TACTICAL TERMINAL

C-7. The CTT will provide the joint warfighter with seamless, near real-time tactical intelligence and targeting information; it provides the critical data links to battle managers, intelligence centers, air defense activities, fire support, and aviation nodes across all services. The JTT will be capable of accessing information transmitted over the Tactical Reconnaissance Intelligence Exchange Service (TRIXS); TIBS, using both UHF Single Channel Tactical Satellite (SCTACSAT) and LOS; Tactical Data Information Exchange System-B (TADIXS-B); and Tactical Receive Equipment and Related Applications (TRAP)/TDDS. The Integrated Broadcast Service (IBS) will subsume all the above radio networks, as well as several others.

C-8. The two-channel AN/USR-5 CTT receives simultaneously on two networks. The three channel AN/USC-55 is a full-duplex CTT/H3 radio, capable of operating full duplex in one network and receiving two additional networks simultaneously. The three channel AN/USR-6 receive-only CTT/HR3 is capable of receiving three networks simultaneously. As an electronic counter countermeasure (ECCM) feature, the CTT is HAVE QUICK II compliant.

JOINT TACTICAL TERMINAL

C-9. The JTT is the technical/materiel replacement for the CTT, as well as several other legacy radio systems. The JTT radios begin fielding in FY 2000. The AN/USC-52 is the transmit and receive model; the AN/USR-9 is the receive only model. The receive capacity of radios is determined by the quantity of cards installed. The baseline radio can receive four channels simultaneous.

ENHANCED POSITION LOCATION REPORTING SYSTEM

C-10. The AN/VSQ-2 EPLRS or the SINGARS are the primary data distribution systems for Army SHORAD weapons systems that utilize the FAADC^2 system. The Forward Area Air Defense Command, Control, and Communications (FAADC^{3}I)-equipped SHORAD battalion uses EPLRS to establish a data network that interconnects the A^{2}C^2; Air Battle Management Operations Center (ABMOC); sensors and C^2 nodes; battery, platoon, and section headquarters; and individual weapons systems. EPLRS passes the air picture and weapons control orders down and sends weapon system status back-up through the system. An extended air picture is received from Patriot, the E-3A Sentry/AWACS, and/or the E-2 HAWKEYE systems over the Joint Data Network (JDN), using the JTIDS at either the A^{2}C^2 node or the ABMOC. The external air picture is fused with the air picture received from the SHORAD's organic AN/MPQ-64 Sentinel, filtered at the individual sensor C^2 node for specific geographical AIs, and broadcast to all affiliated C^2 or weapons subscribers.

C-11. EPLRS is a secure, jam-resistant data communications system utilized by SHORAD to provide data distribution at corps and lower echelons. EPLRS is also utilized with the Force XXI Battle Command Brigade and Below (FBCB^2) system by nonair and missile defense OPFACs to pass situation awareness information on the battlefield. In some instances SHORAD OPFACs are operating in both the FAADC^{3}I data networks and the FBCB^2 networks simultaneously. The down-sized Net Control Station EPLRS (NCS-E) is mounted on an High Mobility Multi-purpose Wheeled Vehicle (HMMWV) and is controlled by Army signal units.

AN/ARC-164 (V) RADIO

C-12. The AN/ARC-164 radio is an Army/Air Force standard avionics UHF-AM radio that has been adopted by the Army for use in several shelter-based, developmental TOC systems. In the joint operations environment, the AN/ARC-164 will provide voice communications with the E-3A Sentry/AWACS and both voice and data communications with AEGIS ships during littoral operations. This radio is limited to LOS operations and has HAVE QUICK anti-jam characteristics. One model of the AN/ARC-164 can be

configured to operate in the very high frequency (VHF) FM frequency band that makes it Single Channel Ground and Airborne Radio System (SINCGARS) compatible.

IMPROVED HIGH FREQUENCY RADIO

C-13. The AN/GRC-193, AN/GRC-213, and AN/PRC-104 AM Improved High Frequency Radios (IHFRs) provides long-range CNR connectivity between operational elements at all echelons of the Army. IHFRs are primarily used as back-up communications, in the event the ACUS or organizational unique communications networks fail. IHFRs are capable of transmitting and receiving voice and data and must be externally secured through the use of the KY-99 MINTERM COMSEC device. The IHFR replaces the Army's AN/GRC-106 and several other AM radios. The IHFR uses the RT-1209 receiver in all three configurations. The AN/PRC-104 is a low power (20 W) system configured for man-pack operations. The AN/GRC-213 is a low power (20 W) system configured for vehicular operations. The AN/GRC-193 is a high-power (100–400 W) system configured for vehicular operations and has a planning range of up to 2,500 miles. The IHFR operates in the 2–20 MHz frequency range.

JOINT TACTICAL INFORMATION DISTRIBUTION SYSTEM CLASS 2M RADIO

C-14. The AN/GSQ-240 JTIDS is an advanced radio system, which provides data distribution, position location, and identification capabilities in an integrated form with application to joint military operations. Army air defense currently plans to utilize the JTIDS at several operational levels as the media to broadcast and receive an enhanced joint air picture over the JDN. The in-theater JDN will provide a shared, joint C^2 data and information exchange form. JDN operatives can include US Air Force (USAF) E-3A Sentry/AWACS, Control and Reporting Center (CRC), other intelligence platforms and fighter aircraft; E-2C HAWKEYE, AEGIS ships and fighter aircraft; US Marine Corps (USMC) Tactical Air Operation Module (TAOM) and fighter aircraft; and the Army AAMDC, ADA brigades, SHORAD battalions, Patriot battalions and batteries, THAAD C^2 battalions and batteries, and JTAGS detachments. While JTIDS is capable of both voice and data operations, Army ADA users currently utilize the Class 2M version that provides only data communications. The Multifunctional Information Distribution System (MIDS) is the low-cost, follow-on successor to the JTIDS.

C-15. The JTIDS radio satisfies the integrated requirements by basing the system architecture on a Time Division Multiple Access (TDMA) design to provide a time slot, multinet structure. This structure divides time over a 12.8-min epoch, into 7.8125 msec time slots, which results in 128 time slots/sec/net and 98,304 time slots/net in one epoch. Frequency hopping patterns are used to provide anti-jam capability by forcing enemy jammers to spread jamming energy over a wide frequency hopping, frequency range. JTIDS frequency hopping is done in pseudo random patterns based on the JTIDS crypto variables, which are impossible for a potential enemy jammer to predict. One hundred and twenty-seven separate nets can be operated simultaneously, in synchronization with a Net Time Reference (NTR) network.

AREA COMMON USER SYSTEM

C-16. The ACUS is the in-theater, tactical communications equivalent to civilian phone service. The ACUS is installed and operated by the Army signal brigades at the EAC and corps levels and organic signal battalions in the divisions' environment. The ACUS utilizes the MSE communications family of equipment that consists of a variety of multichannel radio and switching systems to form a communications network to provide bulk-encrypted (secure), voice and data, and tactical packet network switching. User owned and operated devices that facilitate connectivity to the MSE-ACUS include the TA-1035/U Digital Nonsecure Voice Terminal (DNVT) with data port; the KY-68 Digital Secure Voice Terminal (DSVT) with data port, used for above SECRET and/or special security access transmissions; the AN/UXC-7 lightweight tactical facsimile; and the AN/VRC-97 mobile subscriber radio terminal (MSRT), which provides mobile secure voice into the MSE network. MSE equipment operates at 16 Kbs and is not operationally compatible with EAC TRITAC-ACUS.

C-17. At the EAC, the ACUS uses TRITAC equipment. TRITAC is a joint communications family of equipment that uses a variety of multichannel radio and switching systems to form a network that provides bulk-encrypted (secure), voice and data, and tactical packet network message switching. TRITAC user owned and operated devices that facilitate connectivity to the TRITAC-ACUS include the TA-1042/U DNVT with data port; the KY-68 DSVT with data port for above SECRET and/or special security access; the AN/UXC-7 lightweight tactical facsimile; and for a very limited number of subscribers the AN/VRC-97 MSRT, which provides mobile secure-voice into the MSE network. TRITAC equipment operates at both 16 kbs and 32 kbs (selectable) and may be used with both the TRITAC and MSE equipment networks.

C-18. The Warfighter Information Network-Terrestrial (WIN-T) is the Army ongoing force modernization initiative that will field a new generation of both network and common user equipment. The High Capacity Trunk Radio (HCTR) will replace the current AN/GRC-226 UHF multichannel radio in order to provide more trunk capacity to units. Major nodes will be interconnected by beyond line-of-sight (BLOS) satellite system equipment capable of operating in both the military and civilian frequency bands. Asynchronous Transfer Method (ATM) switching will more efficiently utilize the rapidly shrinking frequency band availability. Wireless TOCs that utilize deterministic, multi-path radio systems will further reduce the demand for frequency spectrum, making tactical video teleconferences (VTCs) possible on future battlefields.

QUADNET RADIO

C-19. The QUADNET is a COTS radio that provides receive-only connectivity to most UHF frequency band radio nets. The QUADNET radio may be operated in either the LOS or SCTACSAT mode, and is capable of simultaneous reception of four radio networks, that is, TDDS, TIBS, Secondary Imagery Dissemination System (SIDS) (imagery), and Tactical Digital Information Link (TADIL)-A. Through the use of a software configuration, the QUADNET radio is also TADIXS-A and TADIXS-B

capable. The QUADNET radio may be configured for secure operations through the addition of an internal COMSEC/Transmission Security (TRANSEC) Integrated Circuit (CTIC) Device Hybrid (CDH) crypto chipset or an externally connected KGV011A, KG-84, KG-40, or KGR-96 COMSEC device. The QUADNET radio will be replaced by the JTT.

SINGLE CHANNEL GROUND-AIR RADIO SYSTEM

C-20. SINCGARS is the Army's current generation of tactical CNR. SINCGARS is primarily used during mobile operations, site installation and set-up, and as a local area back up for ACUS. SINCGARS is also routinely used for C^2 with elements that by their very nature are mobile and therefore, normally accessible only through CNR; such activities would include vehicle recovery platforms (tracked and wheeled), ammo/missile/logistical resupply operations, and forward deployed, mobile weapon platforms.

SINGLE CHANNEL TACTICAL SATELLITE RADIO

C-21. SCTACSAT facilitates secure voice and data communications between ground elements that are BLOS, for which it is not possible to support with ground retransmission resources. SCTACSAT has been allocated for use in corps and division warfighter and operations-intelligence nets. SCTACSAT is also utilized for the TBM Early Warning Net, which connects a variety of air and missile defense OPFACs at the EAC and corps levels (AAMDC, THAAD, Patriot, and JTAGS). Through the use of the mandated Demand Assigned Multiple Access (DAMA) feature, it will be possible to multitask a single radio into more than one radio net. This feature reduces the requirement for cascading early warning notification and eliminates the time delays associated with such operational methods.

C-22. The AN/PSC-5 is the Army's objective SCTACSAT radio that will replace the AN/PSC-3, AN/VSC-7, Motorola LST-5 Series, the MISTE-II, and the WSC-3. SCTACSAT radios may also be operated in a "LOS mode," which allows them to operate in most UHF radio networks.

SYNTHESIZED UHF COMPUTER-CONTROLLED EQUIPMENT SUBSYSTEM RADIO

C-23. The Synthesized UHF Computer-Controlled Equipment Subsystem (SUCCESS) radio is a fully automated microprocessor-based, computer-controlled, UHF-band radio. Data may be transmitted and received simultaneously over its one transmit and three receive channels. Two SUCCESS radios may be stacked to provide an integrated, fully redundant, two transmit and six receive channel capability. The radio is designed to communicate with selected airborne, terrestrial, and satellite systems. The SUCCESS radio is compatible with the AN/ARC-164, AN/ARC-171, WSC-3, AN/PSC-3, KG-34, and KG-84. This is not a standard Army radio.

TROJAN SPIRIT

C-24. Trojan Spirit is a remote intelligence collection and distribution system. It consists of mobile satellite ground terminals, which transmits and receives bulk encrypted intelligence information and data to designated subscribers. Trojan Spirit is a tri-band satellite terminal system capable of operating in the C, Ku, and X bands. This system will receive, display, and transmit

digital imagery, weather, and terrain products, templates, graphics, and text between CONUS and outside CONUS bases and can be used to support split-based, inter- and intra-theater operations. Trojan Spirit uses CONUS-based data processing, whose database is constantly updated from multiple sources and either broadcast to designated users or may be "pulled" by designated users. Trojan Spirit is unique to the intelligence community.

UHF BEACON CHANNEL

C-25. Tactical Automated Situational Receiver (TASR) utilizes the GPS receiver to transmit early warning or other situational awareness. Messages are stored on the device so that if the user later moves into an area contaminated by NBC attack, the device will cross-reference the location resident from its GPS with a stored warning message and warn the user to leave the area. Warnings are provided if the message is still valid with respect to time and the user's current location. This concept of allowing the receiver to filter messages based on knowledge and location is referred to geodynamic filtering.

GLOBAL BROADCAST SYSTEM

C-26. The Global Broadcast System (GBS) will utilize a militarized version of direct broadcast television to augment and interface with other theater and global communications systems to provide a high-speed, one-way flow of high volume information. Utilizing an in-theater inject node, the GBS will broadcast, on separate channels, a variety of information that could include friendly force situational awareness or threat force situational awareness—on separate channels and updated at regular times. Commercial news and sports for health and welfare, as well as intelligence, logistical, weather, and medial information would all be available by selecting a channel and either watching or down-loading the information. The GBS will facilitate both smart-push information tailored to specific situations and will also respond to warfighter requests for specific information (user-pull). User owned and operated receivers, currently anticipated to go to the battalion level at corps and division, would utilize the user's OPFACs processor to process the desired information.

UHF SATCOM/LOS RADIO SET, AN/ARC-187

C-27. The AN/ARC-187 UHF radio is utilized by a number of air and missile defense and nonair and missile defense C^2 OPFACs to exchange both voice and data. Currently the AN/ARC-187 is not type classified [does not have an Army line item number (LIN)]; and is utilized in air and missile defense C^2 operations to transmit and receive data in TADIL-A format. This radio is HAVE QUICK II anti-jam capable and is also TADIL-C capable. When utilized for voice operations, the AN/ARC-187 uses the KY-57 COMSEC device and, when utilized for data operations, uses the KG-40 COMSEC device for over-the-air security.

HF RADIO SET R-350K

C-28. The R-350K radio is a COTS device utilized to facilitate the exchange of TADIL-A data over the high frequency (HF) band. This radio is currently

found in several Army air and missile defense C² OPFACs. The R-350K radio is operated with the data terminal set AN/USQ-111 (MX-512P, touch screen) and data terminal set AN/USQ-125 (MX-512PV). It utilizes the KG-40 COMSEC device for over-the-air security during data operations.

PAGER ALERT WARNING SYSTEM

C-29. The Army has implemented the I-PAWS to facilitate early warning to individual soldiers and other larger OPFACs utilizing a COTS paging system. Following detection by larger theater resources, early warning would be disseminated by a number of means, which normally involves cascading to one degree or another. Through a theater inject node, PAWS would provide a simultaneous warning capability down to the individual soldier level.

C-30. While a technically sound capability, the operational aspect of frequency allocation and paging protocols in different countries does present challenges to effective employment of PAWS. From an operational perspective, the area of coverage may be reduced to best utilize limited pager resources and cover the critical assets that TBMs are most likely to be targeted against.

Glossary

A²C²	Army airspace command and control
AADC	Area Air Defense Commander
AAMDC	Army Air and Missile Defense Command
AAWC	Anti-Air Warfare Commander
ABCCC	Airborne Battlefield Command And Control Center
ABMOC	Air Battle Management Operations Center
ACA	airspace control authority
ACE	analysis and control element
active air defense	Direct defensive action taken to nullify or reduce the effectiveness of hostile air action. It includes such measures as the use of aircraft, air defense weapons, weapons not used primarily in an air defense role, and electronic warfare. See also air defense. (Joint Pub 1-02)
active defense	Operations that protect selected assets and forces from attack by destroying TM airborne launch platforms and/or TMs in flight. Active defense also includes those actions that mitigate the effectiveness of targeting and delivery systems through EW against remote or onboard guidance systems.
ACUS	Army Common User System
ADA	air defense artillery
ADE	Air Defense Element
ADOCS	Automated Deep Operations Coordination System
ADW	air defense warnings
aerospace defense	1. All defensive measures designed to destroy or nullify attacking enemy aircraft and missiles and also negate hostile space systems. 2. An inclusive term encompassing air defense, ballistic missile defense, and space defense. See also air defense; space defense. (Joint Pub 1-02)
AFATDS	Advanced Field Artillery Tactical Data System
AFFOR	Air Force Forces
AGCCS	Army Global Command and Control System
AGL	above ground level
AGM	attack guidance matrix

AI	area of interest
air defense	All defensive measures designed to destroy attacking enemy aircraft or missiles in the Earth's envelope of atmosphere, or to nullify or reduce the effectiveness of such attack. See also active air defense; aerospace defense; passive air defense. (Joint Pub 1-02)
ALCM	air-launched cruise missile
ALERT	attack and launch early reporting to theater
AM	amplitude modulation
AMDCOORD	Air and Missile Defense Coordinator
AMDPCS	Air and Missile Defense Planning and Control System
AMDTF	Air and Missile Defense Task Force
anti-radiation missile	A missile which homes passively on a radiation source. See also guided missile. (Joint Pub 1-02)
AO	area of operations
AOC	air operations center
AOR	area of responsibility
APOD	airports of debarkation
ARFOR	Army Forces
ARM	anti-radiation missile
ARSOF	Army Special Operations Force
ARSPACE	Army Space Command
ASAS	All Source Analysis System
ASCC	Army Service Component Commander
ASCM	anti-ship cruise missile
ASM	air-to-surface missile
ASOC	Air Support Operations Center
ATACMS	Army Tactical Missile System
ATM	asynchronous transfer method
ATO	air tasking order
attack operations	Offensive actions intended to destroy and disrupt enemy TM capabilities before, during, and after launch. The objective of these operations is to prevent the launch of TMs by attacking each element of the overall system, including such actions as destroying launch platforms, RSTA platforms, C^2 nodes, and missile stocks and infrastructure.
AWACS	Airborne Warning and Control System

BCD Battlefield Coordination Detachment

BCP Battery Command Post

BDA battle damage assessment

BDE brigade

BIDS Biological Integrated Detection System

BLOS beyond line-of-sight

BM ballistic missile

BMC4I The BMC4I system links passive defense, active defense, and attack operations to provide timely assessment of the threat, to include IPB; rapid dissemination of tactical warning; and poststrike assessment to the appropriate TMD element. For each operational element, the BMC4I system must provide rapid communications among intelligence assets, and fusion and decision-making facilities, warning systems, and weapon systems, to include a capability for rapid coordination with supporting combatant commanders.

BN battalion

BTRY battery

C2 command and control

C2W command and control warfare

C3 command, control, and communications

C4I command, control, communications, computers, and intelligence

CAAD combined arms for air defense

CCIR commander's critical information requirements

CDH CTIC Device Hybrid

CEP circular error probable

CGS Common Ground Station

CIC combat intelligence cell

CINC Commander in Chief

CM cruise missile

Cmd Command

CNR combat net radio

COA course of action

COCOM combatant command

COMSEC communications security

CONPLAN contingency plan

CONUS	continental United States
COTS	commercial off-the-shelf
CP	command post
CRC	Control and Reporting Center
CRE	control and reporting element
CS	combat support
CSS	combat service support
CTIC	COMSEC/TRANSEC Integrated Circuit
CTOC	Corps TOC
CTT	Commander's Tactical Terminal
CVRT	criticality, vulnerability, recuperability, and threat
D³A	decide, detect, deliver, and assess
DA	direct action
DAADC	Deputy Area Air Defense Commander
DAL	defended asset list
DAMA	Demand Assigned Multiple Access
DCA	defensive counter air
DISE	Deployable Intelligence Support Element
Div	division
DNVT	Digital Nonsecure Voice Terminal
DOCC	Deep Operations Coordination Cell
DoD	Department of Defense
DP	decision point or decontamination pumper
DPG	Defense Planning Guidance
DSP	Defense Support Program
DST	Decision Support Template
DSVT	Digital Secure Voice Terminal
DTOC	Division TOC
EAC	echelon above corps
ECCM	electronic counter countermeasure
EEFI	essential elements of friendly information
EMCON	emission control

EO	electro-optical
EPLRS	Enhanced Position Location Reporting System
ESJ	Escort Support Jammer
EW	electronic warfare
FA	field artillary
FAA	forward assembly areas
FAADC²	Forward Area Air Defense Command and Control
FAADC³I	Forward Area Air Defense Command, Control, Communications, and Intelligence
FBCB²	Force XXI Battle Command Brigade and Below
FFIR	friendly forces information requirements
FM	Field Manual or frequency modulation
FROG	free rocket over ground
FSCM	fire support coordination measures
FSCOORD	fire support coordinator
FSE	fire support element
FSU	former Soviet Union
FU	fire unit
GAT	Guidance Apportionment and Targeting
GBS	Global Broadcast System
GCCS	Global Command and Control System
GPS	Global Positioning System
GSE	ground support equipment
HCTR	High Capacity Trunk Radio
HE	high explosive
HF	high frequency
HIMAD	High-to-Medium Altitude Air Defense
HMMWV	High Mobility Multi-purpose Wheeled Vehicle
HPT	high payoff target
HPTL	high payoff target list
HUMINT	human intelligence

HVT	high value target
IBS	Integrated Broadcast Service
ICAC²	integrated combat airspace command and control
ICBM	intercontinental ballistic missile
IEW	intelligence and electronic warfare
IFF	identification, friend or foe
IHFR	Improved High Frequency Radio
IMINT	imagery intelligence
INF	Intermediate Nuclear Force
INS	inertial navigation system
Intel	intelligence
I-PAWS	Interim Pager Alert Warning System
IPB	intelligence preparation of the battlespace
IR	infrared
IRBM	intermediate-range ballistic missiles - 3,000 to 5,500 km range
ISR	intelligence, surveillance, and reconnaissance
JAOC	Joint Air Operations Center
JDN	Joint Data Network
JFACC	Joint Force Air Component Commander
JFC	Joint Force Commander
JFLCC	Joint Force Land Component Commander
JFMCC	Joint Force Maritime Component Commander
JFSOCC	Joint Force Special Operations Component Commander
JIC	Joint Intelligence Center
JIPTL	Joint Integrated Prioritized Target List
JOA	Joint Operations Area
JOC	Joint Operations Center
joint theater missile defense	The integration of joint force capabilities to destroy enemy theater missiles in flight or prior to launch or to otherwise disrupt the enemy's theater missile operations through an appropriate mix of mutually supportive passive missile defense; active missile defense; attack operations; and supporting C4I measures. Enemy theater missiles are those that are aimed at targets outside CONUS. Also called JTMD. (Joint Pub 1-02)

JP	Joint Publication
JSEAD	joint suppression of enemy air defense
JSOTF	Joint Special Operations Task Force
JSTARS	Joint Surveillance and Target Attack Radar System
JTAGS	Joint Tactical Ground Station
JTCB	Joint Targeting Coordination Board
JTF	Joint Task Force
JTIDS	Joint Tactical Information Distribution System
JTT	Joint Tactical Terminal
LACM	land attack cruise missiles
LCC	Land Component Commander
LCR	large-caliber rockets
Ldr	leader
LIN	line item number
LNO	liaison officer
LOC	lines of communications
LOS	line-of-sight
MARFOR	Marine Forces
METT-TC	mission, enemy, terrain and weather, troops, time available, and civil considerations
MI	military intelligence
MIDS	Multifunctional Information Distribution System
MINTERM	miniaturized terminal
MLR	multiple launch rocket
MLRS	Multiple Launch Rocket System
MOPP	mission oriented protective posture
MRBM	medium-range ballistic missiles - 1,000 to 3,000 km range
MSE	mobile subscriber equipment
MSRT	mobile subscriber radio terminal
NAI	named areas of interest
NAVFOR	Navy Forces

NBC	nuclear, biological, and chemical
NBCRS	NBC reconnaissance system
NBCWRS	NBC warning and reporting system
NCS-E	Net Control Station-EPLRS
NTR	Net Time Reference
O&I	operations and intelligence
OB	order of battle
OCOKA	observation and field of fire, cover and concealment, obstacles, key terrain, and avenues of approach
OPCON	operational control
OPFAC	operational facility
OPLAN	operation plan
OPORD	operations order
OPSEC	operational security
OPTEMPO	operational tempo
PAH	platoon area hazard
passive air defense	All measures, other than active air defense, taken to minimize the effectiveness of hostile air action. These measures include deception, dispersion, and the use of protective construction. See also air defense. (Joint Pub 1-02)
passive defense	Operations that provide essential individual and collective protection for friendly forces, population centers, and critical assets. The principal measures used to accomplish passive defense are tactical warning, reducing targeting effectiveness, reducing vulnerability, and recovery and reconstitution.
PAWS	Pager Alert Warning System
PGIP/T	predicted ground impact point/time
PIR	priority intelligence requirements
Plt	platoon
POE	port of entry
PSYOPS	psychological operations
R&D	research and development
RADC	Regional Air Defense Commander
RCS	radar cross section

RF	radio frequency
ROE	rules of engagement
ROZ	restricted operations zone
RPV	remotely piloted vehicle
RSTA	reconnaissance, surveillance, and target acquisition
SAAWC	Sector Anti-Air Warfare Coordinator
SADC	Sector Air Defense Commander
SAM	surface-to-air missile
SASO	stability and support operations
SATCOM	satellite communications
SBIRS	Space-Based Infrared System
SCTACSAT	Single Channel Tactical Satellite
SEAD	suppression of enemy air defense
Sec	section
SHORAD	Short-Range Air Defense
SIDS	Secondary Imagery Dissemination System
SIGINT	signals intelligence
SIGO	signal officer
SINCGARS	Single Channel Ground And Airborne Radio System
SLAM	Standoff Land Attack Missile
SLBM	submarine launched ballistic missiles
SM	submunition
SOA	special operations aviation
SOC	Special Operations Command
SOCCE	Special Operations Command and Control Element
SOCOORD	Special Operations Coordinator
SOE	states of emission
SOF	special operations forces
SOMPF	special operations mission-planning folder
SOP	standard operating procedure
SOR	states of readiness
space defense	All defensive measures designed to destroy attacking enemy vehicles (including missiles) while in space, or to nullify or reduce

	the effectiveness of such attack. See also aerospace defense. (Joint Pub 1-02)
SPOD	seaports of debarkation
SR	special reconnaissance
SRBM	short-range ballistic missiles - 30 to 1,000 km range
SRF	Strategic Rocket Force
SSJ	Self-Screening Jammer
SUCCESS	Synthesized UHF Computer-Controlled Equipment Subsystem
TAAMDCOORD	Theater Army Air and Missile Defense Coordinator
TACC	Tactical Air Command Center
TACDAR	tactical data and reporting
TACSAT	tactical satellite
TADIL	Tactical Digital Information-Link
TADIXS-B	Tactical Data Information Exchange Broadcast System
TAH	target area hazard
TAI	target areas of interest
TAMD	theater air and missile defense
TAOC	Tactical Air Operations Center
TAOM	Tactical Air Operation Module
TASR	Tactical Automated Situational Receiver
TBM	theater ballistic missile
TDDS	Tactical Data Distribution System or TRAP Data Distribution System
TDMA	Time Division Multiple Access
TEL	transporter erector launcher
TERCOM	terrain contour matching
TES	Theater Event System
TGO	terminal guidance operations
THAAD	Theater High Altitude Area Defense
theater missile	A missile, which may be a BM, a CM, or an ASM (not including short-range, nonnuclear, direct fire missiles, bombs, or rockets such as Maverick or wire-guided missiles), whose target is within a given theater of operation. See also joint theater missile defense. (Joint Pub 1-02)
TIBS	Tactical Information Broadcast Service

TLE	target location errors
TM	tactical missile or theater missile
TMD	theater missile defense
TOC	tactical operations center
TPFDD	time-phased force deployment data
TPFDL	time-phased force deployment list
TPL	time phase lines
TRANSEC	Transmission Security
TRAP	tactical receive equipment and related applications
TRITAC	tri-service tactical communications
TRIXS	Tactical Reconnaissance Intelligence Exchange Service
TST	time-sensitive targets
TTP	tactics, techniques, and procedures
UAV	unmanned aerial vehicles
UHF	ultra high frequency
UI	Unified Instruction
UN	United Nations
USAF	United States Air Force
USMC	United States Marine Corps
USSPACECOM	United States Space Command
UW	unconventional warfare
VHF	very high frequency
VTC	video teleconference
WIN-T	Warfighter Information Network-Terrestial
WMD	weapons of mass destruction
WME	weapons of mass effect
WOC	Wing Operations Center

Bibliography

AFDD 2-1.1. *Counterair Operations*. 6 May 1998.

Chairman of the Joint Chief of Staff. *National Military Strategy, Shape, Respond, Prepare Now - A Military Strategy for a New Era*. 1997.

CINCSPACE Concept of Operations (CONOPS) for Command and Control (C2) of Space Forces.

Department of Defense Directive DoDD-5100.1. *Functions of the Department of Defense and Its Major Components.* 25 September 1987.

FM 1-100. *Army Aviation Operations*. 21 February 1997.

FM 3-3. *Chemical and Biological Contamination Avoidance*. 16 November 1992.

FM 3-3. *Nuclear, Biological and Chemical (NBC) Vulnerability Analysis*. 12 November 1997.

FM 3-4. *NBC Protection*. 29 May 1992.

FM 3-5. *NBC Contamination*. 1 November 1993.

FM 3-19. *NBC Reconnaissance*. 19 November 1993.

FM 3-50. *Smoke Operations*. 4 December 1990.

FM 3-100. *Chemical Operations Principals and Fundamentals*. 8 May 1996.

FM 3-101. *Chemical Staffs and Units*. 19 November 1993.

FM 5-100. *Engineer Operations*. 27 February 1996.

FM 5-103. *Survivability*. 10 June 1985.

FM 6-20. *Fire Support in the Airland Battle.* 17 May 1988.

FM 6-20-2. *Tactics, Techniques and Procedures for Corps Artillery, Division Artillery, and Field Artillery Brigade Headquarters*. 7 January 1993.

FM 6-20-10. *Tactics, Techniques and Procedures for the Targeting Process*. 8 May 1996.

FM 6-20-30. *Tactics, Techniques and Procedures for Fire Support for Corps and Division Operations*. 18 October 1989.

FM 8-9. *NATO Hand book on the Medical Aspects of NBC Defense Operations AMEDP-6(B)*. 1 February 1996.

FM 8-10. *Health Service Support in a Theater of Operations.* 1 March 1991.

FM 8-10-7. *Health Service Support in a Nuclear, Biological and Chemical* FM 6- *Environment.* 22 April 1993.

FM 8-10-8. *Medical Intelligence in a Theater of Operations.* 7 July 1989.

FM 8-285. *Treatment of Chemical Agent Casualties and Conventional Military Chemical Injuries.* 22 December 1995.

FM 19-1. *Military Police Support for the Airland Battle.* 23 May 1988.

FM 19-4. *Military Police Battlefield Circulation Control, Area Security, and Enemy Prisoner of War Operations.* 7 May 1993.

FM 20-3. *Camouflage.* 14 November 1990.

FM 21-10. *Field Hygiene and Sanitation.* 22 November 1988.

FM 21-11. *First Aid for Soldiers.* 27 October 1988.

FM 22-51. *Leader's Manual for Combat Stress Control.* 29 September 1994.

FM 31-20. *Doctrine for Special Forces Operations.* 20 April 1990.

FM 34-1. *Intelligence and Electronic Warfare Operations.* 27 September 1994.

FM 34-25-3. *All-Source Analysis System and the Analysis Control Element.* 3 October 1995.

FM 34-130. *Intelligence Preparation of the Battlespace.* 8 July 1994.

FM 44-94. *AAMDC Operations,* Final Draft. September 1999.

FM 44-100. *US Army Air Defense Operations.* 15 June 1995.

FM 55-10. *Movement Control in a Theater of Operations.* 8 December 1992.

FM 90-20. *J-FIRE Multiservice Procedures for the Joint Application of Firepower.* 6 November 1997.

FM 90-41. *JTF Liaison Handbook - Multiservice Tactics, Techniques and Procedures for the Joint Task Force (JTF) Liaison Operations.* 26 August 1998.

FM 100-1. *The Army.* 14 June 1994.

FM 100-5. *Operations.* 14 June 1993.

FM 100-6. *Information Operations.* 27 August 1996.

FM 100-7. *Decisive Force: The Army in Theater Operations.* 31 May 1995.

FM 100-8. *The Army in Multinational Operations.* 24 November 1997.

FM 100-9. *Reconstitution.* 13 January 1992.

FM 100-10. *Combat Service Support.* 3 October 1995.

FM 100-13. *Battlefield Coordination Detachment (BCD).* 5 September 1996.

FM 100-17. *Mobilization, Deployment, Redeployment, Demobilization.* 28 October 1992.

FM 100-18. *Space Support to Army Operations.* 1 June 1995.

FM 100-103. *Army Airspace Command and Control in a Combat Zone.* 7 October 1987.

FM 100-103-1. *ICAC2 Multiservice Procedures for Integrated Combat Airspace Command and Control.* 3 October 1994.

FM 101-5. *Staff Organization and Operations*. 31 May 1997.

FM 101-5-1. *Operational Terms and Graphics*. 30 September 1997.

Joint Pub 1-02. *Department of Defense Dictionary of Military and Associated Terms*. 23 March 1994.

Joint Pub 3-0. *Doctrine for Joint Operations*. 1 February 1995.

Joint Pub 3-01. *Joint Doctrine for Countering Air and Missile Threats.* 19 October 1999.

Joint Pub 3-01.5. *Doctrine for Joint Theater Missile Defense*. 22 February 1996.

Joint Pub 3-52. *Doctrine for Joint Airspace Control in the Combat Zone.* 3 December 1993.

MCWP 3-25. *Control of Aircraft and Missiles.* 26 February 1998.

UI 10-30. *US Space Command Unified Instruction*.

Index

A

AAMDC, 1-2, 1-7, 1-9, 3-3, Figure 3-1, 3-4, 3-5, 3-6, 3-7, 3-8, 3-10, 4-3 through 4-14, 5-5, 5-6, 5-8, 5-11, 5-12, 6-2, 6-3, 6-4, 6-5, 6-7, 6-8, 7-12, 7-13, 7-14, 7-17, 7-19, 7-21, B-3, B-4, Figures C-1 through C-5, C-8, C-10

ACA, 3-2, 3-3, 4-7, 6-3, 6-8, B-4, C-2

ACE, 1-9, 3-4, 3-6, 4-4, 4-5, 4-7, 4-9, 4-13, 4-14, 5-4, 5-10, 5-11, 5-12, 5-13

ADA, 1-6, 1-8, 3-3, 3-4, 3-5, 3-8, 3-11, 4-3, 4-7, 4-8, 4-12, 6-1, 6-2, 6-3, 6-4, 6-5, 6-8, 6-9, 7-8, 7-12, 7-13, 7-14, A-6, B-4, C-8

ADW, 3-5

AGM, 5-10, 5-11, 5-14

air and missile defense annex, 3-3, 3-7, 4-5, 4-7, 6-2, 6-3, 7-17, B-1

Air and Missile Defense Planning and Control System. *See AMDPCS*.

Air Defense Artillery. *See ADA.*

air defense warnings. *See ADW.*

air picture, 6-1, 6-9, C-7, C-8

air tasking order. *See ATO.*

aircraft operations, 1-4, 2-4

airspace control authority. *See ACA.*

airspace management, 3-5

alert warning, 4-1, 7-10

AMDPCS, 3-6, 4-3, Figure C-2

analysis and control. *See ACE.*

anti-radiation homing, 2-9, 2-11

anti-ship, 2-8

AO, 2-4, 5-1, 5-5, 5-6, 5-7, 5-8, 5-10, 5-15, 6-1, 6-3, 7-2, A-2, A-3, A-7, B-2

AOR, 4-5, 4-8

area of operations. *See AO.*

area of responsibility. *See AOR.*

ARFOR Commander, 1-7, 3-3, 3-4, 3-5, 3-7, 3-9, 3-10, 4-2, 4-3, 4-4, 4-5, 4-6, 4-7, 4-8, 4-10, 4-13, 5-1, 5-5, 5-6, 5-8, 6-1, 6-2, 6-3, 6-5, 6-7, 6-8, 7-8, 7-10

ARFOR TAMD Cell, 3-5, 5-6, 6-3

Army Air and Missile Defense Command. *See AAMDC.*

Army Forces. *See ARFOR.*

Army Service Component Commander. *See ASCC.*

Army Tactical Missile System. *See ATACMS.*

ASCC, 1-2, 1-7, 4-2

asymmetric capabilities, 2-1

ATACMS, 5-7, 5-11

ATO, 4-3

attack guidance matrix. *See AGM.*

Avenger, 4-12, Figure C-2

avenues of approach, A-3, A-4, A-6, A-7, A-10

B

battle damage assessment. *See BDA.*

Battlefield Coordination Detachment. *See BCD.*

battlefield effects, 1-8

battlefield environment, 1-8, A-1, A-2, B-2

battlespace, 1-2, 1-3, 1-9, 1-10, 3-9, 6-6, A-2, C-1

BCD, 3-4, 3-5, 3-10, 3-11, 4-10, 5-5, 5-6, 5-11, 5-13, B-6

BDA, 2-10, 3-9, 3-10, 3-11, 4-1, 4-4, 4-8, 4-10, 4-11, 4-13, 5-4, 5-5, 5-7, 5-12, 5-13, 7-18

biological agent, 2-16, 7-4, 7-15, 7-20, 7-21

blister agent, 2-20

C

C^2, 1-3, 1-8, 1-9, 1-10, 2-6, 2-7, 3-5, 3-6, 3-8, 3-12, 4-1, 4-2, 4-4, 4-7, 4-10, 4-11, 4-12, 5-1, 5-2, 5-7, 5-9, 5-10, 5-13, 6-4, 6-7, 7-3, 7-12, 7-16, 7-19, 7-22, A-9, B-7, C-7, C-8, C-10, C-11, C-12

C^4I, 1-3, 1-4, 1-5, 1-6, 1-8, 1-10, 3-2, 3-3, 3-7, 3-8, 3-10, 3-11, 4-1, 4-2, 4-6, 4-7, 4-8, 4-9, 4-14, 4-15, 5-2, 5-10, 6-1, 6-3, 6-4, 7-10, 7-18, 7-22

camouflage and concealment, 1-5, 7-2, 7-4, Figure 7-2, 7-5, 7-6, 7-9, 7-17, 7-18, 7-19

CEP, 2-5, A-8

CGS, 4-9, 4-11, 5-14

chemical agent, 2-14, 2-16, 2-18, 7-4, 7-15, 7-20, 7-21

choking agent, 2-20

circular error probable. *See CEP.*

civil defense, 7-3, 7-17

civilian authorities, 1-8, 3-10, 4-13, 7-3, 7-18

COA, 1-9, 4-6, 4-7, 4-12, 4-14, 6-5, 7-11, 7-17, A-1, A-2, A-10, A-11, A-12, B-2

coalition forces, 1-3, 1-4, 7-12

combat operations, 1-4, 1-5, 1-8, 3-1, 3-3, 4-3, 4-7, 4-14, 5-3, 7-3

combat service support. *See CSS.*

combatant commander, 1-3, 3-1, 4-6

combined arms operations, 1-9

command and control. *See C^2.*

command, control, communications, computers, and intelligence, *See C^4I.*

Common Ground Station. *See CGS.*

communication security. *See COMSEC.*

COMSEC, 7-11, C-8, C-10, C-12

concept of operations, 1-1, 1-7, 3-1, 3-2, 3-6, 3-11, 4-1, 4-5, 4-6, 4-7, 6-3, 6-8, B-1, B-3, B-4, B-6, C-1

CONPLAN, 4-5, 6-4, 7-16, 7-17

contingency plan. *See CONPLAN.*

counter-proliferation, 7-16, 7-18

countersurveillance, 1-5

course of action. *See COA.*

critical assets, 1-3, 1-4, 1-6, 1-7, 4-12, 5-6, 5-8, 6-1, 6-9, 7-1, B-1, B-4, C-12

CSS, 1-8, 1-9, 3-8, 6-1, 7-8, 7-9, A-11

D

D^3A, 3-5, 3-9, 3-11, 4-7, 4-8, 4-10, 5-2, Figure 5-1, 5-3

DAL, 3-2, 4-3, 4-5, 4-12, 4-14, 6-3, 6-4

decentralized execution, 1-4, 1-6, 1-7, 1-8, 4-1, 4-9, 5-2, 5-14

deception, 1-5, 3-8, 3-10, 4-11, 5-9, 5-10, 7-3, 7-4, 7-6, 7-9, 7-17, 7-18, 7-19

decide, detect, deliver, and assess. *See D^3A.*

decision support template. *See DST.*

decisive operations, 2-3, 2-4, 4-6, 4-13, 4-14, 5-14, 5-15, 6-8, 7-21

deconfliction, 3-4, 4-5, 5-7, 5-9, 5-12

decontamination, 7-3, 7-8, 7-15, 7-19, 7-20, 7-21

deep operations, 1-9, 3-5, 4-6, 4-14, 5-6, 5-11, 5-13

Deep Operations Coordination Cell. *See DOCC.*

defended areas, 1-4, 2-8

defended asset list. *See DAL.*

Defense Planning Guidance. *See DPG.*

Defense Support Program. *See DSP.*

demobilization, 2-4, 4-15, 5-15, 6-9, 7-22

deployment and entry operations, 2-4, 4-7, 5-5, 5-9, 5-15, 6-9, 7-18

direct and indirect fires, 1-8

dispersal, 3-10, 7-1, 7-3, 7-17, 7-18, 7-19, 7-22

DOCC, 1-9, 3-4, 3-5, 3-9, 4-3, 4-6, 4-7, 4-9, 4-10, 4-11, 4-14, 5-6 through 5-14, B-3

DPG, 2-11

drone, 2-10, 2-14, 2-16, 2-19

DSP, 3-6, 4-13, 7-11, 7-12, 7-14, 7-21

DST, A-11

dual mode seeker, 2-10

E

EAC, 3-3, Figure 3-1, 3-9, 4-2, 4-3, 4-4, 4-7, 4-8, 4-12, 5-6, 5-13, 6-2, 6-4, 6-8, 6-9, B-4, C-9, C-10

early warning, 1-3, 1-4, 1-8, 3-10, 4-8, 4-12, 6-4, 6-6, 7-3, 7-9, 7-10, 7-11, 7-12, 7-13, 7-19, 7-22, B-6, C-10, C-11, C-12

echelon above corps, *See EAC.*

electronic warfare. *See EW.*

electro-optical guidance system, 2-9

electro-optical. *See EO.*

EMCON, 3-5, 7-5, 7-9, A-11

emission control, *See EMCON.*

engagement operations, 1-4, 3-2, 6-8

EO, 2-9

EW, 1-5, 2-11, 5-2, 5-7, 5-13, 7-17

F

field artillery, 1-8, 1-9, 5-6, 5-7, 5-11, B-3

fire control system, 2-14

fire support, 1-6. 1-9, 2-7, 2-10, 3-4, 3-10, 4-9, 5-2, 5-3, 5-4, 5-5, 5-7, 5-9, 5-11, 5-12, C-6

fire-and-forget system, 2-11

force projection operations, 1-2, 2-3, 3-4, 4-12, 4-13, 5-8, 6-1, 6-2, 6-5, 7-4, 7-21, 7-22

forced entry, 4-8, 6-7, 7-3, 7-19

fratricide, 1-4

friendly forces, 1-3, 3-7, 3-8, 5-2, 5-7, 5-10, 5-15, 6-1, 6-6, 7-1, 7-5, 7-10, A-2, A-3

G

geopolitical assets, 1-2, 1-3, 2-3, 2-6, 3-11, 6-1, 6-2, 6-7, 6-9

ground support equipment, *See GSE.*

GSE, 2-16, 2-18

Gulf War, 1-2, 2-3, 2-9, 2-16, 2-17

H

hardening, 1-5, 3-10, 7-1, 7-2, 7-9, 7-17, 7-18, 7-19, 7-21

high payoff targets. *See HPT.*

high-value targets, 2-4, A-1

HPT, 3-5, 3-9, 4-7, 5-2, 5-4, 5-10, A-1

I

impact point prediction, 4-1, 7-11

inertial navigation system. *See INS.*

information dominance, 1-3, 1-10

information security, 7-5

information warfare, 2-1

INS, 2-8

integration, 1-1, 1-3, 1-6, 1-7, 1-10, 2-6, 3-1, 3-3, 3-4, 3-5, 3-6, 4-1, 4-2, 4-3, 4-5, 4-6, 4-8, 4-9, 5-2, 6-1, 6-2, 6-3, 6-7, 7-2

intelligence preparation of the battlefield. *See IPB.*

intelligence, surveillance, and reconnaissance. *See ISR.*

interoperability, 3-1, 3-11, C-1

IPB, 1-7, 1-8, 3-6, 3-7, 3-11, 4-2, 4-4, 4-5, 4-6, 4-7, 4-8, 4-10, 4-14, 5-7, 5-9, 6-5, 6-6, 6-7, 7-1, 7-6, 7-11, 7-19, 7-20, A-1

ISR, 1-5, 3-9

J

JFACC, 1-2, 3-2, 3-3, 3-4, 3-5, 3-10, 4-7, 4-8, 4-10, 4-12, 5-1, 5-5, 5-13, 6-3, B-3, B-4, C-2, Figure C-1

JFC, 1-1, 1-2, 1-4, 1-6, 1-7, 3-1, 3-2, 3-3, 3-4, 3-7, 3-8, 3-9, 3-10, 3-11, 4-2, 4-3, 4-4, 4-5, 4-6, 4-7, 4-8, 4-9, 4-10, 4-12, 4-13, 4-14, 5-1, 5-5, 5-7, 5-8, 5-9, 5-14, 6-1, 6-5, 6-8, 6-9, 7-12, 7-13, 7-18, C-1, Figures C-1 though C-5

JFLCC, 1-2, 1-7, 3-3, 3-4, 4-2, 4-10, C-2, Figure C-1

joint command, 1-7

joint doctrine, 1-7, 2-1, 4-8, 5-6, 6-1

Joint Force Air Component Commander. *See JFACC.*

Joint Force Commander. *See JFC.*

Joint Force Land Component Commander. *See JFLCC.*

joint force operations, 1-2, 1-3

joint mission, 1-1

Joint Surveillance and Target Attack Radar System. *See JSTARS.*

Joint Tactical Ground Station. *See JTAGS.*

Joint Tactical Terminal. *See JTT.*

Joint Targeting Coordination Board. *See JTCB.*

JSTARS, 4-9, 4-11, Figure C-3

JTAGS, 3-6, 4-12, 4-13, 7-11, 7-12, C-8, C-10

JTCB, 3-2, 4-10

JTT, 7-12, 7-14, C-6, C-7, C-10

K

key terrain, A-3, A-4

L

land line of communication. *See LOC.*

land-based forces, 1-3

large-caliber rocket. *See LCR.*

laser designator, 2-10

laser guidance system, 2-9

launch platforms, 1-1, 1-5, 1-10, 3-9, 4-12, 5-1, A-1, A-4

launch warning, 3-2, 3-7, 4-1

LCR, 2-2, 2-3, 2-7, 2-15, 2-16, 2-18, 2-20, 2-21

liaison officer. *See LNO.*

LNO, 3-2, 3-4, 3-6, 4-7, 4-8, 4-10, 5-5, B-6

LOC, 1-2, 1-3, 1-9, 2-1, 2-3, 5-13

M

maneuver, 1-8, 3-7, 3-10, 4-13, 6-1, 6-2, 6-8, A-4, A-5, A-11

maneuver assets, 1-8

maneuver units, 1-8, 5-6

marshalling areas, 2-4, 5-5, A-5, A-9, A-11

MI, 3-6, 3-8, 4-4, 4-11

military intelligence. *See MI.*

mission area analysis, 4-7

mission-oriented protection posture. *See MOPP.*

MLR, 2-2, 2-3, 2-7, Figure 2-4, 2-13, 2-14, 2-15, 2-16, 2-18, 2-19, 2-20, 2-21

MLRS, 2-7, 5-12, B-3

mobilization and predeployment operations, 2-3, 4-6, 5-8, 6-5, 6-7, 7-17

MOPP, 7-11, 7-15, 7-19, 7-20

multinational force commander, 1-6, 4-9

multinational forces, 1-1, 1-3, 1-6, 1-7, 2-1, 2-3, 3-2, 3-7, 4-2, 4-3, 4-4, 4-6, 5-8, 6-4, 6-7

Multiple Launch Rocket System. *See MLRS.*

multiple launch rockets. *See MLR.*

N

NAI, 3-6, 4-11, 5-4, A-11, B-2

named areas of interest. *See NAI.*

national command authority, 2-6

NBC, 2-4, 2-8, 2-21, 3-8, 3-10, 4-6, 4-8, 4-13, 7-1, 7-2, 7-3, 7-4, 7-8, 7-10, 7-15, 7-16, 7-17, 7-18, 7-19, 7-20, 7-21, 7-22, A-7, C-11

NBC protection, 1-5, 7-1, 7-2, 7-3, 7-4, 7-17, 7-18, 7-19

near real-time communications, 4-9

near real-time information, 2-11

near real-time targeting, 2-3, 3-11

nerve agent, 2-20

nuclear, biological, and chemical. *See NBC.*

O

onboard guidance, 2-7

OPCON, 3-1, 3-3, 3-6, 4-2, 4-8, 5-12, 6-1

operational area, 3-2, 3-3, 3-9, 3-10, 4-6, 4-7, 4-13, 4-15

operational control. *See OPCON.*

operational facility. *See OPFAC.*

operational order. *See OPORD.*

operational plan. *See OPLAN.*

operational security. *See OPSEC.*

operational tempo, *See OTEMPO.*

OPFAC, C-2, Figure C-1, C-7, C-10, C-11, C-12

OPLAN, 4-4, 4-5, 4-6, 5-8, 5-12, 6-2, 6-3, 6-5, 7-17, A-3, A-11, B-1

OPORD, 3-3, 4-6, 4-7, 5-8, 6-2, 6-5, A-3

OPSEC, 3-8, 3-10, 7-4, Figure 7-5, 7-5, 7-17, 7-19, 7-21, A-9, A-10

order of battle, 3-6, 6-7, A-7

OPTEMPO, 5-8, 7-1, 7-10, 7-19

P

Pager Alert Warning System. *See PAWS.*

Patriot, 4-12, 7-12, Figure C-2, C-3, C-7, C-8, C-10

PAWS, 4-13, 7-13, C-12

physical security, 7-5

planning priority guidance, 3-2

political advisor, 3-2

population centers, 1-3, 2-1, 2-3, 2-4, 2-6, 4-13, 7-1, 7-7, 7-14, 7-21

positional advantage, 1-8

post conflict, 2-4, 4-14, 5-15, 6-9, 7-21, 7-22

power-projection capabilities, 2-14

precision strike, 1-3, 2-1, 2-4

precision-guided munitions, 2-9

predicted impact points, 1-4, 6-6

preemptive strike, 2-3, 2-4, 3-11, 4-10, 7-16

proactive attack operations, 3-7, 6-7

prophylaxis, 7-4, 7-9

protect the force, 1-8, 1-10, 3-7, 3-11, 4-7, 6-9, 7-6, 7-18, A-2

psychological operations. *See PYSOPS.*

PYSOPS, 7-16, 7-19

Q

R

radar cross section, *See RCS.*

radio command guidance system, 2-9

RCS, 2-5, 2-8, 2-9, 2-11

reactive attack process, 5-10

reconnaissance, surveillance, and target acquisition. *See RSTA.*

reconstitution, 3-8, 4-14, 4-15, 7-1, 7-7, Figure 7-4, 7-17, 7-19, 7-21, 7-22

recovery and reconstitution, 1-5, 4-14, 7-1, 7-7, Figure 7-4, 7-17, 7-19, 7-22

reload operations, 2-6

reverse-engineered, 2-13

risk assessment, 3-7, 4-8

ROE, 1-7, 3-7, 3-8, 3-9, 3-11, 4-5, 4-7, 4-8, 4-9, 4-14, 5-8, 5-10, 5-15, 6-1, 6-5, 6-6, 6-9, A-2, B-4

RSTA, 1-8, 1-10, 2-1, 2-3, 2-10, 2-11, 3-7, 3-9, 3-11, 4-7, 4-14, 5-1, 5-8, 5-9, 5-10

rules of engagement. *See ROE.*

S

SASO, 1-2, 1-3, 4-15, 6-9

SATCOM, 7-14, C-11

satellite communications. *See SATCOM.*

search and destroy, 4-11

shoot and scoot, 2-14

SHORAD, 6-4, 6-6, C-3, Figure C-2, C-7, C-8

short-range air defense. *See SHORAD.*

signal security, 7-5

signature reduction, 7-5

single point failures, 7-3

situational awareness, 1-9, 4-7, 4-14, 5-6, 5-9, 6-1, C-11

smart submunition warheads, 1-4

SOF, 1-5, 1-9, 4-9, 4-10, 5-4, 5-6, 5-7, 5-8, 5-9, 5-10, 5-11, 5-13, 5-15, 6-1, 7-19, B-3

space-launch vehicle, 2-13

Special Operations Forces. *See SOF.*

stability and support operations. *See SASO.*

stay hot and shot fast, 5-11

sustainment engineering, 7-8

sustainment operations, 6-1

synchronization, 1-6, 1-7, 3-1, 4-9, 5-1, 5-6, 6-8, 7-8, C-9

T

TAAMDCOORD, 3-4, 3-7, 3-8, 4-3, 4-10, 4-12, 6-2, 6-3, 6-4, 6-5

tactical operations center. *See TOC.*

tactical warning, 3-8, 3-10, 4-12, 7-1, 7-7, 7-10, 7-12, 7-14, 7-15

tactics and techniques, 1-3, 4-8, 5-1, 7-19

TAI, 4-11, 5-4, 5-9, A-1, A-11

target areas of interest. *See TAI.*

target management, 4-14, 5-8

TEL, 2-4, 2-6, 2-16, 2-18, 4-11, 5-2, 5-10, 5-13, A-4, A-6, A-11

TERCOM, 2-8

terrain contour matching. *See TERCOM.*

terrain delimitation analysis, 3-6, 5-10

TES, 3-6, 4-12, 4-13, 7-11, 7-12, 7-14

THAAD, 4-12, 4-13, 7-12, C-8, C-10, Figure C-2

Theater Army Air and Missile Defense Coordinator. *See TAAMDCOORD.*

Theater Event System. *See TES.*

Theater High Altitude Area Defense. *See THAAD.*

theater of operation, 1-1, 1-4, 1-10, 2-1, 3-4, 4-14, 5-8, 6-6, A-6, C-6

Time-sensitive target. *See TST.*

TOC, 3-6, 4-3, 4-9, 4-12, 5-11, 5-14, 6-4, B-4, C-7, C-9

topographic engineering, 7-8

transnational groups, 2-21

transporter erector launcher. *See TEL.*

TST, 5-14

U

UN, 2-11, 2-17, 2-20, 2-21

United Nations. *See UN.*

unity of effort, 1-6, 1-7, 3-11, 4-8, 5-5, C-1

V

voice communications, 1-8, 4-2, 5-12, C-7

W

warn the force, 1-6, 4-8, 4-13, Figure 7-3, 7-13, 7-17, 7-22, B-5

weapons of mass destruction. *See WMD.*

weapons of mass effect. *See WME.*

weather analysis, A-6

WMD, 1-1, 1-3, 1-4, 1-10, 2-1, 2-3, 2-4, 2-5, 2-6, 2-11, 2-13, 2-14, 2-16, 2-17, 2-18, 2-20, 2-21, 2-22, 4-7, 4-13, 6-6, 6-7, 7-2, 7-3, 7-4, 7-8, 7-11, 7-13, 7-15, 7-16, 7-17, 7-19, 7-20

WME, 1-1, 1-3, 1-4, 1-10, 2-1, 2-3, 2-4, 2-5, 2-6, 2-11, 2-13, 2-14, 2-16, 2-17, 2-18, 2-20, 2-21, 2-22, 4-7, 4-13, 6-6, 6-7, 7-2, 7-3, 7-4, 7-8, 7-11, 7-13, 7-15, 7-16, 7-17, 7-19, 7-20

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